THE ANATOMY OF MUSIC

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THE ANATOMY OF MUSIC

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A COMPLETE POPULAR OUTLINE
OF MUSICAL THEORY

WINTHROP
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MANUFACTURED IN THE UNITED STATES
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TO

JONATHON NORN

who, in that place set apart for dreamers, has peopled my night with suns, my day with starlight; who laughs with an obese universe at its own immensity; and who, at the fine point of a drawing-pen, fashions for its consolation those songs Space would make if it were not so clumsy,

I DEDICATE THIS BOOK

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PREFACE

The following chapters are an amplification of a series of lectures delivered by the author over the radio. They are designed, as the lectures were designed, not to induct amateurs into the gigantic mysteries of tonal theory, but rather to induce music lovers at large to undertake a study which—all reports to the contrary notwithstanding—is hardly less simple than it is profitable, and not at all less profitable than it is interesting.

Exhortation by itself is usually fruitless. I have therefore done more than simply thump the two arms of my pulpit. In the first place, I have tried to dispel the inferiority complex with which most amateur musicians are afflicted. In the second place, amateur musicians often suppose that musical theory, if not too grandly difficult of comprehension, is at least too abstract to be of definite value. Since this second error is as great as the first one, I have pointed out many of the numerous ways in which the direct value of such studies is considerable. In short, I wish to persuade the musical public at large that no peculiar talents are required for studying harmony and counterpoint, and

that pursuing them is distinctly profitable and emphatically easy.

I would not have the reader imagine that merely glancing through the following pages makes the actual study of musical theory unnecessary. At the same time a great many persons neglect this very study just because they suppose that the road to musical learning is a royal one: they dare not profane that purple highway with their humble footsteps. To convince them to the contrary is this book's purpose. It is a remedy for a general ill rather than a cure of technical innocence which work must dissipate—but I am thoroughly persuaded that this first step is a generous half of the whole journey.

What is harmony? What is counterpoint? What is a fugue? What is a canon? What is the actual constitution of music? These are five questions which this book answers. In answering them it also answers a large number of other questions to which the average music lover, like his amorous cousin in less ethereal fields, is sometimes too faint-hearted with emotion to demand an answer. If I can spare him the consequences of his blushes my reward is ample.

W. P.

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THE ANATOMY OF MUSIC

CHAPTER I

MUSIC IN GENERAL

In order to clear away all needless confusion at the outset, it may be well, before doing anything else, to glance across the entire kingdom of tone, of which the material composing this little treatise is one province. By way of getting our bearings, a bird's-eye view of the whole musical empire will be helpful.

For there are several angles from which music can be regarded. As physicists we may view music in its material nature, studying the air-waves that cause our ear-drums to vibrate. As mathematicians we may view music in its numerical nature, studying the ratios between various rates of vibration. As anatomists and physiologists and neurologists we may view music in its effects upon the body, studying the various organs that respond to aural stimuli. As historians we may view music in its evolutionary development, tracing out the elaboration of scales, the invention of musical instruments, and so forth. As psychologists and biographers we may view music in a more personal manner, examining the lives and mental idiosyncrasies of composers. As critics we may

view music through æsthetic spectacles, probing the tendencies of schools, and weighing the separate virtues of compositions and their interpretations. As practical music-makers we may view music in its reproductive nature, inquiring into the technique of performing on different instruments. And finally, as students of musical theory, we may view music from yet another angle, disregarding all the foregoing perspectives in order to concentrate on those principles which we shall here look at.

Each of these various ways of regarding music is more or less distinct from all the others; and it may be thought useless to have mentioned any but the last one, considering that we shall have very little to do with them hereafter. Yet there is a great deal of popular confusion regarding the meaning of the words "musical theory," and getting rid of this confusion at once is only prudent. For not only is a misconception of these two words widespread; it is largely responsible for the unpopularity of what they stand for. As a matter of fact, the purpose of musical theory is not to teach one how to theorize about music, or to turn one into a lifeless and bloodless theorist; its sole immediate purpose is, or should be, to enable the music-lover to put all his musical experiences on an intelligible and orderly basis. In other words, as musical theorists we have no concern at all (or, at most, only a remote concern) with the physical, mathematical, biographical, psychological, and

æsthetic perspectives. We are concerned instead with music as we actually find it—with those very compositions which we fancy we are familiar with, but with which we actually have hardly bowing acquaintance. We wish to sharpen our ears, discipline our attention, and liberate our imagination—to one end only. *We wish to hear and comprehend what we commonly only listen to and look at.*

In one sense, of course, musical theory might be said to embrace the whole of music—everything but its actual performance. And, indeed, in one sense musical theory embraces even a performance; for the principles on which music is founded, besides being entangled with widely scattered problems—our own anatomy, for example, the history of our species, and so on—are at work in every composition become audible. Nevertheless, as I have just said, this broader use of the words "musical theory" is not the one intended by professional musicians when they refer to the theory of music. What they have in mind is a set of principles derived from the analysis of actual musical compositions, and upon which music in general (though notably European music of recent centuries) is persistently and conspicuously founded.

These principles in their own right are exceedingly interesting, and delving into them as an abstract exercise is worth one's leisure. At the same time—and the point is important enough to bear repeating—the immediate purpose of studying musical theory

is simply to place all one's musical experiences on an orderly and intelligible basis; in brief, it is to reduce one's tonal adventures to rhyme and reason, so that one's mind as well as one's heart may go adventuring.

It is utterly erroneous, therefore, to suppose that the composer alone needs to take up such studies as harmony and counterpoint. No more mistaken idea which I am familiar with prevails so widely; but none has musical consequences so deleterious. For the average music-lover, no less than the gentlemen and ladies who sign contracts with Apollo, needs to grasp this very important subject if he wishes to seize on music with his whole nature rather than snatch at it with two hungry ears only. He needs that discipline which the study of musical theory alone will give him—because no substitute for musical theory has been yet discovered.

At the present time there might seem to be an objection to the study of musical theory which a few decades ago was less in evidence. Modern composition, so it is said, violates most of the rules of classical harmony. Why learn about laws that are being abandoned?

To this particular retort there are two answers. First, the compositions of the great classical and romantic composers—Bach, Handel, Haydn, Beethoven, Mozart, Brahms, Wagner, Schubert, Schumann, Chopin—constitute the chief repertory of our concert-halls in all countries. The majority of the music

one hears today, therefore, is that very music which musical theory directly applies to. Secondly, the rise of modern music—as instanced in the works of such diverse composers as Rimsky-Korsakoff, Scriabin, Debussy, Ravel, Strauss, Schönberg, Stravinsky, Mahler, Honegger, Casella, Gershwin—has not invalidated the principles which we are to look at; the somewhat dizzy height of this tonal superstructure has served rather to accentuate the breadth and solidity of that foundation which modern (and even ultra-modern) music actually rests upon.

It cannot be denied that many modern composers countenance progressions of chords, and combinations of tones, which are at variance with classical traditions; our ears are more tolerant of dissonance than our fathers' were. On the other hand, harmony embraces more than the literally harmonious and helps us to reduce even the most strident discords yet invented to rhyme and reason. Finally, apart from the fact that modern music, for the greater part, is revolutionary in detail rather than in principle, the study of musical theory is indispensable for a reason just noted: it is the only thorough and dependable way of making us actually *hear* what we formerly only listened to. Compositions with which one supposed one was familiar take on a fresh and unsuspected significance. The student of musical theory does not merely stare at musical passers-by; he stops and talks to them. And they, to his delight and surprise, return

the compliment. He delves down below faces till he comes to characters.

The reader may consequently rest assured—should he be persuaded to study musical theory—that his labours will positively not be wasted. It is highly improbable that the major principles of musical composition—what I have called the anatomical and physiological laws of music—will be seriously modified in the near future; and, in view of the fact that some of these principles are echoes of the form and the functions of the human body, the likelihood of their ultimate collapse is less than negligible. As long as we ourselves have spines, scales will undoubtedly persist in all our music; as long as we ourselves are equipped with four limbs, four-part harmony will continue to flourish.

Above and beyond those principles which fall strictly within the compass of musical theory, there are questions of general æsthetics—the larger matters of musical form, and the like—which it will profit any music-lover to consider; and these matters will be surveyed briefly in a concluding chapter. What the following pages aim primarily to do is to take the reader through those general principles on which music of every calibre is founded. The aim of this tour, of course, is not to furnish the reader with many details, or to drill him in them—or, for that matter, to drill them into him! It is to entice the amateur musician into studying something of great musical

importance, something that demands only moderate industry on his part, and something that will reward him more than regally. The method followed is the most persuasive which the writer knows of—which is simply to expound briefly the fundamentals of the whole subject, letting surface acquaintance work its deep and sure enchantment.

CHAPTER II

THE SCALE: THE SPINE OF MUSIC

The word "scale" is a tactless word with which to open any musical discussion, for in the minds of most people it conjures up unhappy memories of enforced drudgery at the pianoforte keyboard. Nevertheless, the scale is so important to music that we must examine it, and examine it at the outset. Like the spine, the scale is scarcely remarkable for its beauty, but there is literally no getting away from it.

The origin of the word is found in the Latin name for ladder or staircase, *scalæ*, from which is also derived the familiar English word "escalator." And the propriety of this origin is obvious; for a scale has definite steps like a ladder, or, preserving our anatomical figure, it is composed of separate tonal elements that are placed one above the other like those separate bony segments of the spinal column. In the one case we have to do with bones, in the other with tones; in the one case we have to do with a greater number of segments than in the other; but, save for these small differences, a spine and a scale might almost be called identical. One is the backbone of the

human body; the other is the backbone of a piece of music.

As the reader doubtless knows, certain low forms of animal life are not equipped with backbones or spinal columns. And, in precisely the same way, primitive music is often partly defective. There are jellyfishes, speaking both tonally and zoologically. If we were to go back to the lowest forms of musical life we should arrive at objects as formless and flabby as those humble creatures. The howl of a hyena is not melody, the croaking of bullfrogs is not harmony, even the wails of savage tribes are not music, because an indispensable feature of the art is not developed. There are no distinct tones laid out in regular order, and set apart from one another in clear-cut fashion, to serve as the specific material out of which music—all music worthy of the name—is compounded.

The first great step in the evolution of music, therefore, was the development of a scale or spinal column. Music did not begin to walk on its hind feet, or even to crawl about on all fours, until it had acquired something equivalent to that bony structure.

Regarding the time of the appearance of this feature no one has authentic information. It is supposed that the inflections of the human voice were stabilized to some extent when language started; and it is also supposed, by such men as Herbert Spencer and his followers, that these inflections served as the origin

of music. We are hence safe in assuming—we cannot prove we are right, but no one can prove we are wrong—that the scale developed late in human history, though it took form prior to civilization. Great obscurity surrounds this point, and wrangles deepen it. The one point that we must dwell on, because of its pre-eminent importance, is that the formation of a scale was indispensable. It was just as necessary to music as the development of vowels and consonants, out of an indiscriminate mass of grunts and groans, was to language.

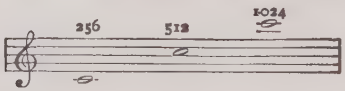
For a reason similar to the foregoing we shall also pass rapidly over the many different scales, and their numerous modifications, which anteceded the particular scale we are now familiar with. For these other scales are exceedingly varied, differing amongst the same peoples in different epochs, and even between different peoples of the same epoch. The Egyptians, Chaldeans, Babylonians, Assyrians, and Phœnicians all appear to have recognized the interval of an octave and to have divided this interval into segments; but precisely how many these segments were is not discovered. The Arabs recognized certain other intervals besides the octave; and the latter was divided into sixteen segments, according to some, or into seventeen segments, according to others. Again, in India and Persia we come upon a scale in which the octave has as many as twenty-two or even twenty-four divisions. And so we might continue almost in-

definitely, probing the peculiarities of these early types of our musical ladder. And indeed, because of their historical eminence, we shall pause for a short time over those seven famous scales (or modes) for which the Greeks are musically noted. First, however, it is proper to speak of that which is as important to a scale as a scale itself is indispensable to music—to wit, an interval.

The interval or distance said to lie between two tones is, of course, nothing but a convenience of language. One can no more hope to put space between tones than between temperatures or odours or flavours. On the other hand, whilst such language is strictly inaccurate, speaking of the distance between tones is legitimate if we recognize that we are referring to the distance between the keys, or positions, on a musical instrument. In this sense there certainly are intervals; and it is in this sense (through a transfer of meaning) that we shall hereafter speak of the intervals in music, or of the distances by which tones are rigidly separated.

Now, there is a large variety of intervals which we might start from, but the octave is the most convenient of all intervals. And for this reason: two tones are said to be an octave distant from each other when they have a relationship which is not unique only, but unusually simple. What is this relationship? It may be expressed in two ways. One form is temporal, the other spatial. The temporal relationship is

the *ratio* of the number of the first tone's vibrations, within a given period of time, to the number of the vibrations of the second tone. And this ratio is unusually simple with reference to the octave, for it happens that the higher tone (the octave of the first) has *exactly double* the number of the lower tone's vibrations. For example, middle C on the piano produces 256 vibrations in one second; the C next above it produces 512 vibrations in one second; and the octave above that, in turn, has double the number of the vibrations of its lower counterpart.* Thus:



The foregoing is the temporal relationship; but, delightfully simple though it is, it is no simpler than the relationship which is spatial. For it again happens that the *length* of a vibrating string has a constant relationship to the tone created by it. For example, take a given string; it yields one specific tone when plucked or vibrated. Now *halve* that string; it yields the exact octave above the previous tone. There is again thus a simple relationship; for if you *double* the length of a string, you secure a tone one octave *below* the original tone, getting *half* the number of vibrations; on the other hand, if you *halve* the length

* Concert pitch varies slightly from this, it may be pointed out in strict accuracy, but the small discrepancy in no way affects the actual principle.

of the string, you secure a tone one octave *above* the original tone, getting *double* the number of vibrations. This follows from the fact that, irrespective of the force with which we pluck it, a string vibrates at a certain speed which its length determines.*

It may now be asked: Why should there be just that unique audible relationship—a mixture of striking similarity and sharp difference—between any given tone and its octave? Well, no one in the world knows. The fact is simply there to be recognized, being felt by almost everyone without effort. But if we do recognize this brute audible fact, as we must, and as even primitive peoples have done repeatedly, we are now in a position to wonder whether other tones lie between these two, and how many those tones might be, and where situated.

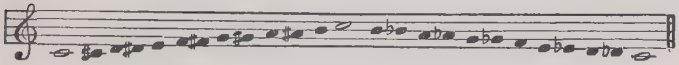
As for the actual number of intermediate tones, an answer is manifestly impossible; the number is an inconceivable multitude. If, for example, we take a string one foot long, another string only six inches long will give us the octave of the first one. But our purpose is to find tones between these extreme lower and upper limits. Let us, therefore, take our longer string and begin shortening it—say, by one inch. Then

* The weight and tension of the string are, of course, factors in the pitch generated, but as they involve ratios which also are simple ones, we neglect them for convenience in illustration. The point being stressed—it is certainly an interesting one—is that the vigour of a blow does not affect pitch; it affects volume or resonance only. Were this not true, music obviously never could be produced on stringed instruments.

we have an eleven-inch string which yields a tone perceptibly higher than the long string. Can we reduce the difference so created? Naturally we can—by taking off only half an inch from our foot string. But if we can shorten a string by only half an inch, we can do so by as little as a quarter of an inch, an eighth, a sixteenth, and so on. Thus in our imagination we might proceed indefinitely, getting tones so close together that our shortened string would vibrate only *once more in a whole year* than the string which served as our lower standard—the foot-long one. And from that microscopically higher tone it would be a long and weary climb up to the octave of the original tone, or to our six-inch string. If a piano were to be constructed on such principles, playing a single octave would occupy more years than those which Methuselah was famously full of.

But such degrees of refinement are aurally useless as well as digitally impossible. We can conceive of their existence, but we cannot hear them. And our question thereupon becomes much more limited. It is not even necessary to inquire into the size of the smallest interval that is discernible; for ears vary in sharpness, as minds in brightness. From the fiftieth to the hundredth part of an octave is commonly distinguishable. It is sufficient to say that, after a long period of experimentation, the minimum size of a musical interval has been decided on. It is called

by musicians a *minor second*, and is the *twelfth part* of an octave exactly. On the piano keyboard it is the distance between any two adjacent notes whatever—irrespective of whether they are white keys or black keys. And the series of these twelve segments of the octave gives us that scale which is known as the chromatic:



With the foregoing facts in mind we are now ready to glance at the seven Greek scales or modes already mentioned; and when we have done this we shall be ready in turn to examine that one particular scale—called the major diatonic scale—which has been selected from amongst these historic seven, and which is the backbone of nearly all our own music.

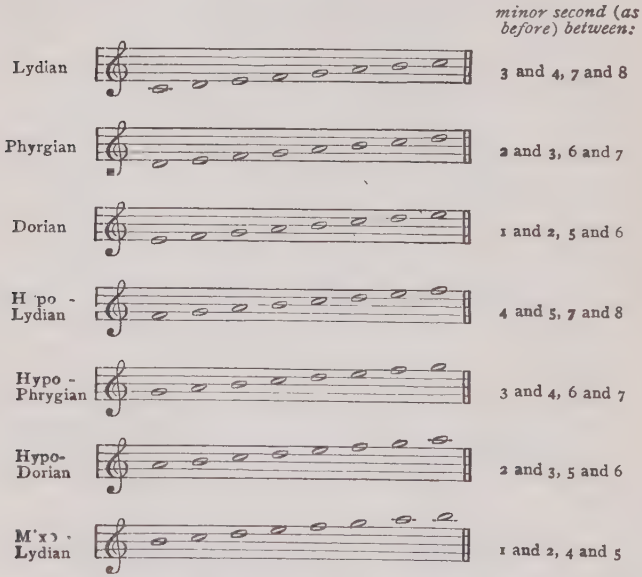
The seven Greek scales mentioned were given geographical names corresponding with the different groups of peoples whence, according to tradition, they originated—the Lydians, Dorians, and Phrygians specifically. The Lydian mode, as we shall see in a moment, is identical with the major scale we are familiar with; the other modes differ from it in one important respect, though in a single point they are identical with it. What are these points of resemblance and disagreement? *The point of resemblance* is that all these Greek modes were composed of seven inter-

vals only (like our own diatonic scale) and that but two of these intervals were minor seconds, the five remaining steps being major seconds. *The point of disagreement* is that the positions taken by these two minor seconds were all (except in the Lydian mode) different from those which our diatonic scale honours. In other words, instead of occurring between the third and fourth and again between the seventh and eighth degrees of the scale (as they do in our diatonic scale), minor seconds occurred between the second and third and again between the sixth and seventh degrees of the scale in the Phrygian mode; and there were similar displacements in the other modes. In the interests of rigid scientific accuracy, it is necessary to warn the reader that any so-called absolute identity of our present diatonic scale and the Lydian mode is a mild misnomer. It is a misnomer because major and minor seconds in our tempered scale are slightly different in size from corresponding intervals in the Greek modes; besides, there are certain other small differences which any strict, scientific comparison would make evident. Our popular comparison is nevertheless sanctioned by custom; and, since it makes illustration possible, it is more than justified.

The foregoing description may be adequate; but in order to make the seven Greek modes inescapably clear, they are set forth on the staff in the following manner:

In all these modes, it will be observed, minor seconds occur twice, though in varying positions; *all the other five intervals, being twice as large,* are major seconds. It therefore follows that we can indicate all these modes without accidentals, simply confining

ourselves to the white keys of the piano. The position from which we start determines the mode by shifting the position of the minor intervals, thus:



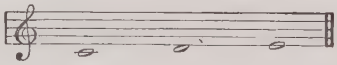
Now, the amount of space which we have given to these seven Greek modes in one sense may be considered largely wasted; for the Lydian alone is used today unaltered. However, there is a special reason for going into this matter in some detail. Speaking more accurately, there are two reasons:

First, it is profitable to realize that the abandonment of a great many different modes, such as the Greeks had, was followed by a tremendous develop-

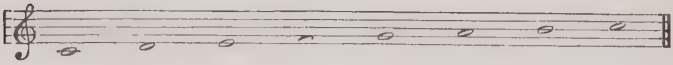
ment in the art of music. A multitude of distinguishable tones was reduced to the twelve of the chromatic scale—this itself was a great stride in music. But these twelve tones (as we have just seen) were reduced to a considerably smaller number—this was a very great stride also. In no dissimilar way the reduction of seven modes to one mode may be regarded as having done a great deal more in turn for the art of music. It is hard to believe, at any rate, that the frailty of Greek music, and the astounding vigour of music during later centuries, are nothing but an historical accident. If we look very closely at this phenomenon we shall suspect, if we cannot prove, that the deliberate abandonment of numerous modes was an important factor. All these steps seem to be impoverishing our musical material; actually, our music is becoming richer—so much richer that a comparison is preposterous. It would seem to be the old case of a river's acquiring power from the banks confining it; or it is the case, if you prefer, of achieving a spinal column at the expense of losing the suppleness of a jelly-fish. And the moral in the present day is not unneeded. The cry for a quarter-tone scale, the cry for music without any tonality—this, if we consult history, is a cry leading us not forward, but backward.

Secondly, one very important fact has been repeatedly emphasized by the modes which we have looked at: most of the intervals are major seconds, though two are invariably minor seconds. And the

importance of this discrepancy is that the segments of our diatonic scale, the steps of our own musical ladder, do *not* follow one another at equal distances —though the ear, accustomed to taking those particular steps, will swear the opposite. A practical little experiment will show this. Let the reader start to sing the C-major scale:



And then let him try to continue moving upward, proceeding by intervals as large as the first ones taken: he will find it almost impossible to do so. In other words, being accustomed to the diatonic scale, in which the intervals are *not* of the same magnitude, he will have no trouble in singing as follows:

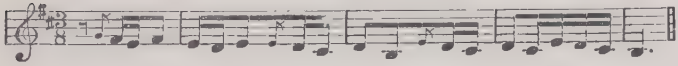


But he will have the greatest difficulty in singing as follows:

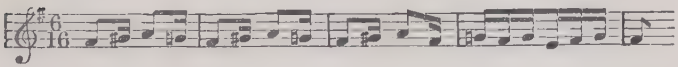
Accustomed as he is to intervals of different sizes, he is stopped short by a series of intervals that are all equal.

The first great musical blunder which this examination of the scale has uncovered is, therefore, a

blunder which every ear makes until it has been trained really to hear what it usually listens to. The untutored ear does not *hear* the scale: it merely listens to an accumulation of its own habits.* Consequently, one helpful way of removing this accumulation of habits is listening attentively, again and again, to diatonic passages in musical compositions. For example, let the reader play over several times on the phonograph the bassoon passage occurring near the beginning of the second movement of Rimsky-Korsakoff's orchestral suite *Scheherazade*:



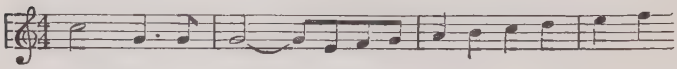
Again, in the early part of the fourth movement of the same work, let him listen to the flute which plays as follows:



Or, turning to some other recorded work, let his ear consult that heroic opening phrase of the *Meistersinger*

* The pianoforte keyboard is so constructed as to mislead the musical student further: it is hard to convince him that the intervals E–F and B–C are minor seconds, because he is confining himself to the white notes and the intervals between all other white notes are major seconds. It is needless to say that this inconsistency is a mere historical accident. A helpful rule in this connexion is the following: any two immediately adjacent notes on the piano keyboard, irrespective of colour, are separated by the interval of a minor second; when one note is skipped, irrespective of its colour, we have a major second.

overture, which *seems* to be mounting by regular intervals, but is not:

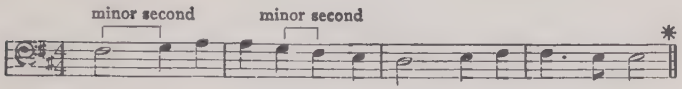


Such experiments as the foregoing, in which the phonograph can be of unique assistance, will do much to make the scale really audible.*

Why we feel the need of using these two different intervals—the major and the minor seconds—in our scale structure; why the Greeks themselves felt this need so strongly as to incorporate in all their modes these two intervals; and why we nowadays insist on that particular distribution of major and minor seconds which the diatonic scale is formally based on—these may be considered abstract questions. Nor has a satisfactory answer to them been offered. The value of our analysis hence lies in a somewhat different direction. It lies, in brief, in the direction of actual compositions rather than in that of psychological or physiological theories. In other words, as musical theorists we promptly accept all the brute facts which are given us—but only as musical theorists do we hear those very facts which we are accepting. The untrained ear is incredibly inattentive. In consequence, if we would hear music, we

* As all readers have a tendency to scant references, let the phonograph be started at this juncture. A good time for beginning anything is immediately!

must train the ear. We must not idly suppose that we hear all that besieges our ear-drums. We must not suppose, until we learn to hear the scale, that we can more than half hear what Beethoven is saying in his Ninth Symphony:

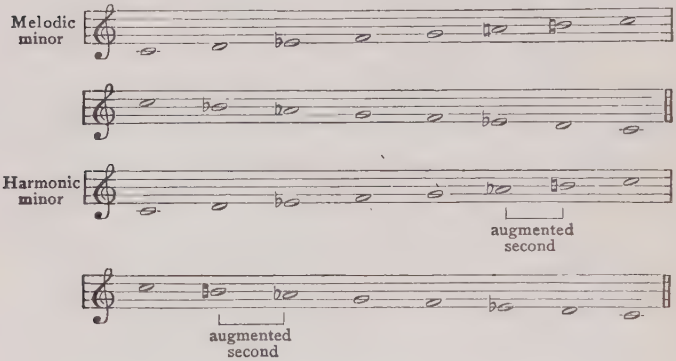


Into an animal's ear pours the very same series of vibrations that hammer at the aural gates of the musician. What accounts for the tremendous difference between the two experiences? This, and this only: the musician hears and comprehends, the animal listens. And the animal, even if he be a biped, will always listen to some extent in vain, for all that he may purchase subscriptions to the Philharmonic or Philadelphia orchestras, until he finally enters that temple of tone to which the disciplined ear is the sole portal.

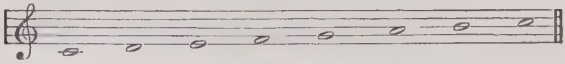
When we come to the minor scale, the series of intervals forming the major scale is altered. In fact, the minor scale by itself is somewhat varied. We have the *melodic* minor scale, which is different ascending and descending; and we also have the *harmonic* minor scale, which, whilst uniform in both directions, in-

* The reader probably will not need to be reminded that this phrase is the main theme of the last movement. The entire symphony has lately been recorded.

troduces us to a new interval—the augmented second. For convenience in comparing these they hence follow:

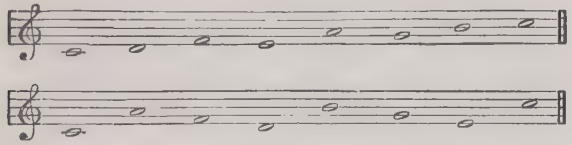


But whilst the minor scale certainly introduces some novel features, and hearing these is also important, the major scale predominates in music. For purposes of illustration, therefore, we shall confine ourselves largely to this scale in the future: for the diatonic major scale—formed in the manner already outlined —is quite literally of major importance. This, then, may be called the spine of music:



Like any good spine, it is, of course, flexible. Although the tones composing it are fixed firmly,

they may succeed each other in different orders. Our spine is naturally capable of many postures:



But, for all this flexibility of the scale proper, the elements forming it are firmly established; and these in turn establish the shape of our musical organisms.

How this column of tones puts forth groups of tones which are sounded together, giving us what we call harmony, is the musical phenomenon which we are now ready to examine.

CHAPTER III

HOMOPHONY: THE ANATOMY OF MUSIC

Our ears have become so thoroughly accustomed to harmony that it would seem to have existed for ever. Yet the first decision to sound two different tones simultaneously was a bold and almost revolutionary experiment. And for a long time after this one revolutionary step was finally taken, no additional tones were added by musicians.

Private experiments were undoubtedly conducted in this matter, but the consequence of these was negligible for many centuries. That the Greeks were interested in music is unquestionable. They developed the various modes which we have just looked at, poetry was almost invariably chanted, and the Pythagoreans went so far as to affirm that music was the language of the entire cosmos. Nevertheless, though Greek writers did harp on the word "harmony (Ἁρμονία)," and though the word "music (Μουσική)" also was conjured with very frequently, both terms are essentially misleading. As for the Pythagorean praise of music, it reduces to a passion for numbers. *Harmony* did not refer, as it does today, to the sound-

ing of tones simultaneously, but rather to mere balance or proportion—a man's life, if it were virtuous, was harmonious. And the word "music" itself was such a broad term that it embraced both lyric and epic poetry. Greek music, in short, in practice was kept to a subordinate position; it consisted of single tones sounded in succession, and was greatly admired by the poets, one may suspect, as a happy instrument for broadcasting their effusions. Occasionally a flute would add a crude species of *obbligato* to intoned syllables, playing a fourth or fifth above the vocal melody; but beyond such barbaric glimmerings of harmony we find nothing. Musicographers have failed to unearth one clear example of Greek harmony, save of the crude variety just indicated; and the Greeks themselves failed to leave behind one verbal passage which can convince us that a taste for harmony, or even the knowledge of it, was developed.

Precisely how long this state of affairs lasted is uncertain—and very possibly because the duration of that state lacked precision. However, when we come to the seventh century after Christ, we find the contemporaries of Gregory speaking of combinations of tones and enumerating not only the octave (which had been previously used), but also the fourth and the fifth as consonant intervals. By the middle of the twelfth century—mark the sluggishness of harmonic development—we find compositions in

three parts; and toward the end of the fourteenth century a mass in four parts is being actually performed at the coronation of Charles V of France. The first known treatise on harmony, however, was not to be produced for nearly another two hundred years, when, in 1558, Giuseppe Zarlino wrote *Le Istituzioni Harmoniche;* and, finally, it was only in 1722 that Jean Philippe Rameau produced his *Traité de l'harmonie réduite à ses principes naturels*—which was not merely a treatise on harmony, but also (apparently) the very first thoroughgoing public recognition of harmony as an independent (but basic) department of music. Theretofore it had been regarded as an adjunct—a pleasant accident occasionally resulting from the chance relations of separate tones sounded together; thereafter it was to be formally recognized as the anatomy of all tonal compositions.

It is perhaps needless to say, before we begin examining the central features of this chief branch of musical theory, that the structural laws which harmony codifies are not immutable laws. There is not a single rule in harmony which the student is not at liberty to break if he cares to. Moreover, he will find that a large number of these rules are sometimes broken for him by compositions of the first order. Nothing is more offensive to the embryo student of musical theory, and nothing is more obnoxious to human reason, than the dogmatic statement that certain things *must* be avoided in music, that cer-

tain other things *must* be adopted. There is nothing at all that one *must* do in the whole of music. It happens, nevertheless, that a great many persons, over a very considerable period of time, have found that they agree conspicuously in numerous details; and the harmony student is quite likely to join that multitude—especially after he has learned to hear music. It is merely the clarification of these points of agreement, therefore, which is the purpose of all so-called laws of harmony; the vote of men, not a vow of heaven, is responsible for them.

The amount of agreement on several points is, however, astonishing. For example, virtually everyone agrees that the octave of any tone is at once similar to its lower counterpart and yet different from it. Virtually everyone, irrespective of his musical training, will likewise agree that certain other intervals are harsh beyond argument. Many other points of agreement might be mentioned.

As notable as any of these, and more important with respect to musical theory, is the number of parts (or voices) composing harmony. How many do we require fundamentally? With how few can we get along in the last analysis? The answer is very explicit: four exactly. *Harmony, or harmonic analysis, is thus the study and orderly arrangement of four separate tones sounded simultaneously.* These four separate tones are called voices. They are not called voices because we sing them, necessarily, but

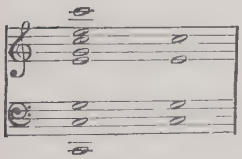
because calling them voices celebrates the fact that, though they *are* sounded simultaneously, they yet are separate. And as a means of further emphasizing their separateness, their independence, we give each voice a separate name: soprano, alto, tenor, bass.

At this point it may be asked why these four separate voices are the proper number. Again an answer, in any ultimate sense, is not possible. Why do we have two ears, and two ears only? The sole reason is the public fact that we do have them. Again, why do we have two arms and two legs, and why does the human voice itself fall into four fairly distinct and separate registers—soprano, alto, tenor, and bass? If there is any ultimate explanation here, no one knows it. The plain and inescapable fact is simply that the registers of the human voice, interestingly enough, do fall into these four general compartments. Two of these voices are high, and two of them are low, like the two arms and two legs of the human body. The facts simply stand before us and demand admission.

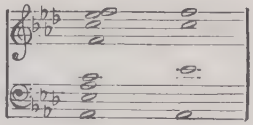
Whether the human voice has thus divided itself into four registers in response to some innate demand for four-part harmony, or whether our satisfaction derived from four-part harmony is a mere accident which has sprung from our vocal registers—this is another point which may be argued and has been argued. But the central fact again survives all disputation. Just as we do have four vocal registers, so

we do find that four-part or four-voice harmony is always, in the last analysis, satisfactory. Four-tone or four-part or four-voice harmony is able to convey the harmonic or anatomical characteristics of every piece of music ever written—whether it be a hymn or a gigue or a sonata, a song or a fugue or a symphony. Fewer than four tones are generally inadequate; more than four tones are generally superfluous. Nor, as we have already said, is this an arbitrary law laid down by harmonists; it is but the expression of a nearly universal fact which theorists have observed in their analyses of actual music, and in their scrutiny of the response of most people. This is not saying that the number of tones may not be profitably augmented on occasion; it *is* saying that such a multiplication of tones, whenever it occurs in a composition, does not alter the harmonic situation by a jot or tittle: adiposity does not modify our anatomy.

Let the reader compare the following illustrations, satisfying himself, by playing them on the piano, that the foregoing statement is a truth and not a dogma:



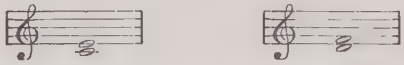
Again:



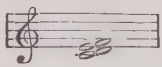
The first of each pair of chords is unquestionably fuller than its companion; but in no respect save in mere fullness is there a difference.

But if we now allow four tones and four only, we immediately wish to know how we select them. We wish to know where these four voices are to be placed with reference to one another if they are stationary, and how we move them about in a body.

As already remarked, some tones are unanswerably unfriendly, whilst others are as plainly amicable toward one another. If, for example, we take the first and third tones of our diatonic scale we have what is known as a concord; and if we then take the second and fourth tones we have another concord, thus:



But if we now take all these four tones simultaneously, our two concords give rise to an obvious discord:



On the other hand, it is equally easy to select two pairs of concords which give rise in turn to another concord:

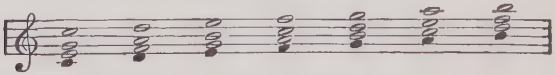
And since we have now found a single quartet which is discordant, and another quartet which is equally

concordant, it might be thought that we have taken the first (if not indeed the last) step in harmony. All we have to do, so it would seem, is to try out various combinations of four tones, putting the discordant groups in one grand collection and the concordant groups in another. Unfortunately, as we shall see later in detail, we cannot dispose of discords as so much refuse: we have very great need of them in music. Besides this, we should soon be embarrassed with numerous quartets of tones which are neither decisively concordant nor discordant. In addition to this, the mere physical task of selecting these groups at random would be prodigious; and, after they had been selected, it would be hard to reduce them to any order. What, then, shall we do? That is the problem given the student of harmony.

And the way in which he is taught to grasp this problem is—paradoxically—to drop it. Suspecting that music is both eminently reasonable and simple in construction, he abandons everything that savours of the haphazard and the complicated, everything that smells of disorder and difficulty; and he proceeds forthwith to govern himself accordingly. That is to say, he momentarily confines himself to one very small part of the field of all the possible quartets of tones strewn around him. He confines himself, in fact, to seven only. And the seven to which he confines himself are, to the end of greater simplicity, all constructed in an identical manner. What is

that one law of construction? It is itself about as simple as one could wish it. Above the lowest tone of all—called the bass—is added another tone a third higher, the tenor; above the tenor (another third higher) comes the alto; and the fourth tone (the soprano) is an octave above the bass or the lowest tone. This, then, is the first quartet so constructed:

And, as just indicated, the other six quartets are all constructed in a manner which is identical. The lowest tone is always one of the seven tones of the scale which has been selected, whilst the three voices above it are in each case a third, a fifth, and an octave above the bass which we reckon from. In consequence, by following this simple rule, we have seven quartets of tones, as follows:



This is certainly a humble, if not an unpromising, beginning. But if its connexion with music seems feeble, and much too childish ever to lead us to musical grandeur, the modesty of our start should not deceive us. For these seven groups of four tones are the little cells from which the grandest organisms derive their being.

It is, of course, true that the particular scale selected for this illustration is only one of many scales in

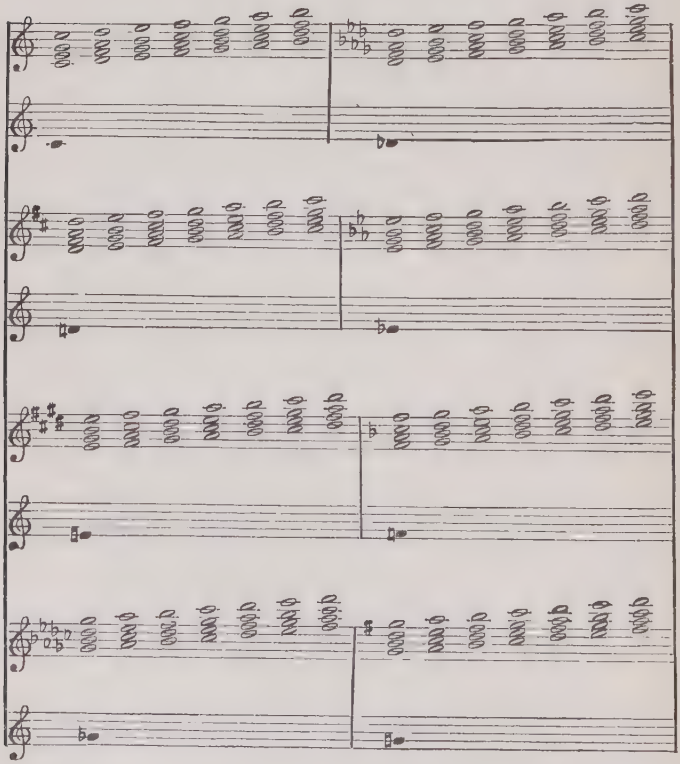
different tonalities. Since the octave (as we saw in the last chapter) is divided into twelve uniform segments, there are a dozen different tonalities corresponding with them. That is to say, a scale similar to the one above is built on each of these twelve chromatic segments. We thus have not only the great spine of the C scale; we have similar spines issuing from each of the elements of that C scale (that is, from D, E, F, G, A, B) besides those on D♭, E♭, G♭, A♭, and B♭.* And our complete tonal skeleton—the anatomical outline of this greater organism which is composed of smaller members, just as a living organism is built of cells, or a town of people—rapidly begins to take on airs of importance. There is no doubt at all that it does so. And our ensuing illustration shows succinctly how this happens.

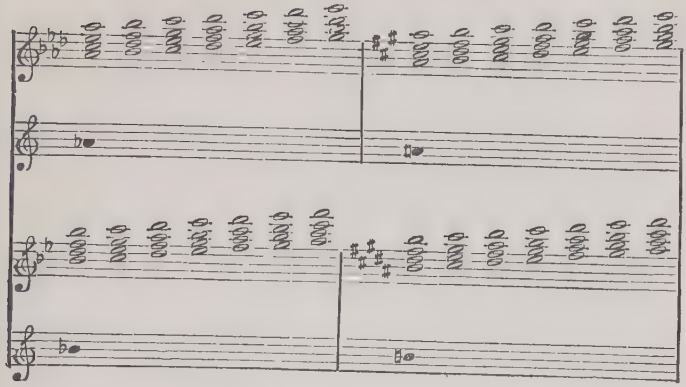
Nevertheless, though we do secure variety, we retain simplicity. And never at any time does that depart from us. Even when our musical skeleton becomes fully articulated; even when sinews gradually develop, and when the softer tonal flesh in turn enwraps them—never once does this steady growth entail confusion.

For, as we shall continue to see, so long as we study music, we ponder clarity. As fast as variety

* Through an enharmonic change these notes may become respectively C♯, D♯, F♯, G♯, A♯ in the well-tempered scale. To dwell on this point here would be confusing. For an explanation of "enharmonic change" see "The Bad-Tempered Scale" in the Appendix.

blossoms, unity garners it. As surely as there are many scales, the steps of all these ladders are always seven, and each one is mounting upward in a common destiny.





CHAPTER IV

DISPERSION AND INVERSION

The title of this work suggests that there is an anatomy and a physiology of music. It is derived from a number of analogies, it is perhaps needless to say, rather than from a rigid resemblance between a living body and a piece of music. In many ways the two structures part company—and in some respects very fortunately for music. Of disease and death we can find no strict tonal parallels (even though, speaking roughly, some compositions are sick from birth and die off rapidly); and we shall need to look twice in order to find musical equivalents of several other characteristics of the human body.

And yet—the resemblance is still quite remarkable. That music has a spine (or scale) like a human being; that four limbs (called voices) spring out from that spine and are joined by it; that the scale is composed of separate segments (notes) like the spinal column; that these segments are unified by tonality (a key-note) just as the spinal cord gives inner unity to that bony structure: all these parallels are fairly arresting. Drawing them plainly, and even stressing

them a little as we are doing, would hence seem to be wholly legitimate. Any device leading people to look more closely into the nature of music can afford to dispense with the justification of strict logic.

It so happens, however, that our procedure is by no means quite fantastic. For the points of resemblance between musical and zoological bodies greatly exceed in number those which heretofore have been mentioned in passing. Some very interesting ones, so far omitted, must now be looked at.

As we shall see, when we come to polyphonic music (or polyphony), there is no hard and fast line between the two main branches of musical theory. The only hard and fast lines in music are on music paper. Harmony, or the structure of four tones treated as one unit, cannot be regarded as wholly independent of counterpoint or polyphony, where *each* one of the four tones is a unit. Nevertheless, although we now begin already to approach the *functions* of our musical organism, we are still chiefly concerned with its *structure*.

It will be recalled that the seven quartets built on the seven degrees of the scale were all formed in one invariable manner. Irrespective of the scale we were moving in, that principle of chord-formation was unaltered. It will hence be sufficient to limit ourselves to one scale only, since anything that is true in one scale is true in others. The following illustrations of the important principles which we now shall

examine are therefore, although for convenience only, confined to the scale of C major.

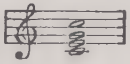
What we found in that scale of C major was a series of seven groups of tones; each group was composed of four voices, and each group stood on a different step of our ladder. The question now naturally arising is: What shall we do with this material? What measures can we adopt for getting rid of its most patent handicap, stiffness?

There are three measures lying at hand, and, for all their great effectiveness, they are simple ones. The first is called *dispersion,* the second is called *change of position,* and the third (the most important) is called *inversion.* By means of dispersion we endow our tonal skeleton with flexibility, equipping it (so to speak) with joints and sinews; and by means of changed position and inversion we not only augment the suppleness thus made possible, but also cover the whole framework with tonal tissue. Let us look at these three principles in order.

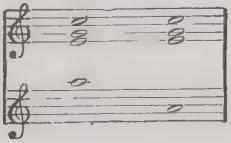
1. *Dispersion.* In the chapter on the scale, one interval particularly caught our attention—to wit, the octave. For some reason, which never has been analysed, but which is none the less impressive in its consequences, doubling the number of vibrations producing a given tone yields another tone at once similar to and different from it. Conversely, halving the number of vibrations results likewise. In the first

case we ascend, in the second case we descend, by an octave.

Now, as we have seen, the difference between any given tone and its octave (or octaves) is a difference which can be readily distinguished. At the same time, the affinity between such tones is marked also. There is so strong a bond between them, in fact, that the tones in many respects may be called identical. Consequently, dispersion (which is the distribution of our four voices over various octaves) is a very fruitful principle in music; for dispersion, making use of the similarity of tones in different octaves, lends an immense degree of flexibility to our four voices without impairing the rigid structure they belong to. For example, the tones in the quartet built up on C:



may take their places in the foregoing arrangement. But now, by means of dispersion, these four voices may be spread out over a larger area. We may drop the bass alone by an octave:

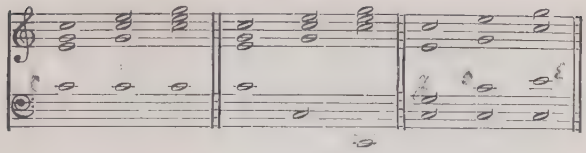


Or, drawing more generously on this principle, we

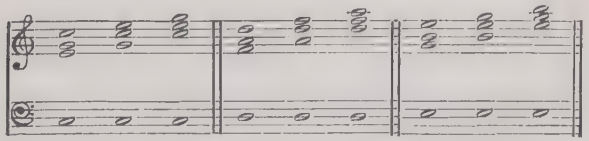
may disperse the upper three voices also, as in the following representative examples:

In no case, it is clear, have we impaired the harmonic structure originally given us; our quartet of voices remains C-E-G-C, as it was initially; nevertheless, thanks to the principle of dispersion, that quartet has become noticeably more flexible, and our tonal skeleton has thus acquired the first semblance of life—namely, articulation.

2. *Change of Position.* The second measure for endowing our tonal structure with vitality is similar to the principle just outlined; being a special case of dispersion, it falls naturally between dispersion and inversion. It owes its effectiveness to the fact that voices may *exchange* tones without thereby *changing* the harmony a particle. For example, without changing the quartet on C in any structural detail, the tenor, alto, and soprano may exchange the tones originally allotted them, passing the notes round to one another, thus:

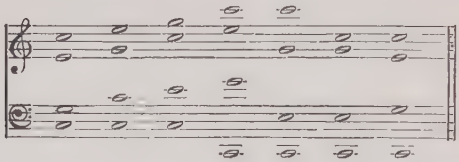


Until we reach inversion (which we are coming to), the bass does not join in this exercise. The three upper voices, however, may redistribute their original tones freely at no cost to the harmony they are forming; and since the bass may at the same time move *by octaves* (that is, the bass holds fast to C, but may select the note C in various octaves), this combination of dispersion and changed position, as the reader will appreciate, is exceedingly fruitful in getting rid of harmonic stiffness. It may be added, in this connexion, that musicians distinguish between two different types of position which are known technically as *open position* and *close position*. The second type—close position—occurs whenever the tenor and soprano are not more than an octave distant from each other. The following chords are hence in *close position:*



Open position, on the other hand, permits any amount of distance between the voices (as long as the tenor

and soprano are *at least* an octave distant). And the following chords are hence in *open position*:



Finally, consolidating the principles we have just looked at, we find that the simple chord C-E-G-C yields such variants as the following:

No one is precisely like any other; each time we have slightly altered our chord's complexion. But the point is, nothing besides the complexion has been altered: a dab of rouge has not managed to dent a character.

3. *Inversion.* The nature of our third device is a little disappointing in description, but in effectiveness it is almost miraculous. A mere description of inversion is in fact painfully feeble considering its tremendous harmonic and musical power, for inversion is nothing at all but an exchange of tones *between the bass and the three upper voices.* Nevertheless, for reasons which now must be examined, this small additional step takes us further than any other step so

far studied. The principle of inversion may be regarded, indeed, as the most important in the anatomy of music; and by all odds it is easily the most interesting.

In any ultimate sense, there is no explanation of the peculiar importance which the bass—invariably the lowest tone of a quartet—possesses. But the ear accords this voice unique honours, second only to those of the soprano, if not exceeding them; and, in proportion to the training which the ear has received, the honours borne by the bass are augmented.

It has been suggested by writers on æsthetics that the spatial arts—painting, sculpture, and architecture—would have been radically different arts supposing that gravitation were not a perpetual experience of the human species. The native fear of falling, the difficulty of rising from the earth's surface, the chronic feeling of being pressed down upon it—all this, so it has been plausibly suggested, accounts for man's satisfaction in viewing masses adequately supported on a firm foundation. Whether this interpretation be a correct one or not, the fact remains that we call for a foundation in music as surely as we call for it in architecture, and the lowest tone hence possesses unique importance. For this reason the bass, which is invariably the lowest tone in music,* is the

* It is, of course, possible for a bass singer to sing some tone lying higher than the tenor; vocal parts may and do cross one another. Harmonically regarded, however, the lowest tone being sounded is the bass invariably.

tone on which all music is builded; intervals are always reckoned *upward*. And it is for this reason, again, that shifting the position of the bass (known as inversion) results in that truly astonishing transformation which we now have come to. For the inversion of a chord, as already suggested, does not merely augment the growing flexibility of our harmonic structure: it begins to cover our harmonic skeleton with tonal tissue. With the advent of inversions, that is to say, we pass beyond the bony framework of music until we reach that softer harmonic flesh which covers over our structure without concealing it. The undisciplined ear cannot hope to savour fully the musical richness which inheres in this third principle, inversion, nor should the reader be dismayed by what eludes him. The principle itself, however, is grasped easily, as the following illustrations make evident:

It will be seen that the bass in each instance has merely moved up from the first tone of a quartet to the second one, producing what is called a first inversion. And again, in the following examples, it will be seen that the bass has merely moved up from the

first tone to the third one, producing what is called a second inversion:

And, as has been remarked, this method of producing inversions is very simple; no principle in music can rival it in the way of securing harmonic variety with minimum effort. For the inversion of a chord extracts from it the maximum of variety. At the same time, inasmuch as the real structure of our chord is unaltered, since the root (its foundation tone) is the same as ever, the inversion and fundamental position of a chord bear a resemblance to each other that is striking—a strange mixture of similar structures and varied textures. The biological metaphor just suggested is hence relevant. An inversion of a chord is not unlike flesh which is laid over a skeleton or, with still greater relevance, is the very transmutation of bone into tissue; for here, as everywhere else in music, growth and development are our paramount principles: we shall look in vain for mere surface decoration.

There are several principles in harmony which so far have not been even hinted at; and their musical importance can certainly not be questioned. But most

certainly there is no other law in the whole realm of music which can outshine this principle called inversion. Violating no principle which came before it, it yet utterly transforms a harmonic structure. What was once a skeleton remains a skeleton; but the powers hidden within it are made manifest for the first time, and a stark outline becomes gracious and radiant.

In the next chapter we shall see this more fully. In examining what are called chords of the seventh we shall observe this principle of inversion at work upon them. Before proceeding to these chords of the seventh, however, it may be wise to pause for a moment, briefly reviewing our recent discoveries.

First amongst these was the principle of dispersion. We found that a notable amount of variety and flexibility could be secured by merely scattering our four voices in different octaves. Without altering our chord in any way whatever, save by spreading the four tones over a greater area, structural stiffness was diminished, if not abolished.

But we found that the three upper voices could do more than simply spread themselves out over a larger area; they could exchange the tones originally appointed for them. In addition to dispersion, but in conjunction with it, we thus arrived at our second principle—changed position. And the value of these two principles was then illustrated.

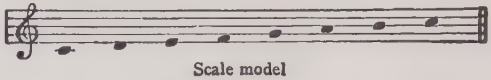
Fruitful as they proved to be, however, in the

way of endowing a chord with the powers of locomotion, neither one quite equalled our third principle; for, thanks to inversions, something yet more remarkable happened. Our chord, our musical skeleton, acquired tissue.

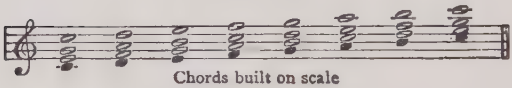
These three principles in condensed form barely hint at the immense powers concealed within them. In order to appreciate their musical potency the reader should turn to actual compositions—almost any will serve the purpose—and there see for himself how frequently actual music makes use of them. There is, indeed, hardly any more astonishing experience than the one which such analyses offer him. To select a few actual compositions that always have seemed remote in their sheer eloquence, and then, step by step, to discover the very substance of that eloquence by uncovering the simple syllables which go to form it —this is nothing less, after reading about refraction, than seeing a rainbow.

But if this study in itself is a revelation, an examination of the mere principles, divorced from compositions, is hardly less so. For it will be found that one principle grows naturally out of another, and yet all are entwined closely in one another. Pondering their development is hence enlightening, and for this reason they are set forth here in serial order. Humble though they appear to be, they are mighty. And they are not more musically potent than they are logically beautiful; for the variety that issues from them en-

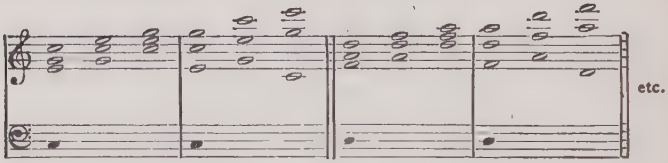
thralls our senses no more surely than the way in which they combine enchants our reason.



Scale model



Chords built on scale



Fundamental position
(open and close position)

First inversion

Second inversion

CHAPTER V

CHORDS OF THE SEVENTH

The demand for four-part harmony, as we already have noticed, is an insistent one. At the same time an outstanding characteristic of all the chords so far examined was tri-tonality. Although four separate tones have been sounded, one always was a duplicate in a different octave.

Now, it cannot be denied that this method of procuring a fourth tone (called doubling) is wholly satisfactory on many occasions. Whilst there is similarity between any tone and its octave counterparts, there is also an element of plain difference; and that difference heretofore has sufficed us. Whatever shortcomings our previous quartets may be said to suffer from, at any rate they managed to give the sense of fullness or completion. As far as the concords heretofore examined were concerned, our simple law of chord-construction proved adequate.

But harmony embraces more than the harmonious. It is obliged to do so for the reason that discords are a frequent demand of human nature. Whatever affection we may have for sugar, we also crave salt and similar condiments; and it happens that our ears,

no less than our tongues, cry out often for the acid and the bitter. Discords, therefore, are a very important element in music; indeed, they may be named indispensable.

As we shall presently see, there are several different methods of injecting this seasoning into music. One of the most famous varieties of tonal seasoning is a musical principle to be studied later—namely, suspension. Hardly less pungent than suspension, however, is the device giving the title to our present chapter. And it is of peculiar interest to the student of harmony. For chords of the seventh, besides furnishing musical compositions with this tart element, are constructed in a manner which is quite original; they are composed, in brief, of four distinct and separate tones, *none* of which is a doubling in some octave.

This statement may disappoint the hopeful reader. He has been told that the anatomical laws of music are simple, and that one law grows out of another in orderly fashion. He hence may feel that the promise of simplicity was deceptive; for he is now informed that a brand-new rule of chord-construction is being inaugurated.

A feeling of slight disappointment is perhaps legitimate, under the circumstances, but there are no grounds for enduring resentment. In fact, chords of the seventh turn out to be compounded in so logical a manner that they are simpler in some respects than

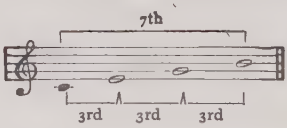
their dulcet rivals. They are very far from being spasmodic and wanton dashes of salt and pepper. On the contrary, they are derived in the most orderly manner. In anatomical terms—returning to our original figure—they fit gracefully into the harmonic structure which we have watched develop. For they are nothing less, if you please, than musical muscles. Nor is it any flight of the fancy to compare discords with the musculature of a body, since they are indispensable to the vigour of music; without a judicious admixture of discords a musical composition would be intolerably flabby.

Since, then, we stand in need of this harsher element, we naturally wish to know how to secure it. How, still proceeding in methodical fashion, can we build up a body of discords?

Chords of the seventh are a brilliant answer to this question. In the first place, as we have just said, the rule for constructing them is a simple one. Secondly, they are able to supply us with the greater number of discords which we have need of. Thirdly —since the laws of dispersion and inversion apply to them—they fit neatly into the rest of our harmonic structure.

That they are structurally simple is at once evident, for each voice is equidistant from its neighbour. In other words, a chord of the seventh differs from a common chord (or concord) in this respect only: the interval of a third separates *all* four voices, in-

stead of only the first three voices, as in concords. Above the bass the tenor appears, a third distant; above the tenor the alto appears, a third distant; and above the alto the soprano appears, a third distant. Proceeding thus by consonant intervals throughout (that is, by thirds) we reach our fourth voice, which is not, as in a common chord, an octave distant from the bass, but, instead, a seventh:

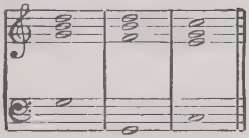


And, proceeding up the scale according to this rule, we hence find ourselves in possession of a series of seven discordant quartets, as follows:

Finally, it is perhaps needless to add, the same principle may be applied to all other scales, so that chords of the seventh correspond with every one of the concordant quartets which were set forth in detail in the second chapter. Following the model above given, that is to say, we can construct a similar series of seventh-chords in the scales of D♭, D♮, E♭, E♮, and so on, each scale giving rise to its own series of seven chords of the seventh.

That these seventh-chords are simple in construction needs no additional comment; nor is it

necessary to dwell on the harshness which they instantly lend to music. The reader who will take the trouble to play the foregoing illustration on the piano will quickly perceive both these points and be convinced of them. And if he will take the further trouble of going again to some actual compositions, he will notice—to his surprise—the frequency with which music is invigorated by these dissonances. In fine, he will grasp the extraordinary fruitfulness of this new principle at work in our tonal organism, even though he is faced with only a single strand of musical muscle in motion:



But so far we have examined only a fraction of the discordant possibilities in these seventh-chords, and we therefore now turn to those latent virtues. It still remains to be seen how the familiar principles of dispersion, changed position, and inversion are applied to chords of the seventh. Dwelling on them at length will be needless; nevertheless, following out their actual application to discords will serve to drive home the immense value of these three principles. Consequently, we shall select a single chord of the seventh—for convenience the one based on the first step of the C scale—and let this one discord illustrate the variety of its innumerable companions.

First, then, for the dispersion of our seventh-chord:

Here, it is obvious, the structure stands secure although the voices have been spread over a greater area. Exactly the same order is followed—C, E, G, B—and harmonically no change at all has resulted. Nevertheless, the stiffness of the original arrangement has been abolished.

But changed position is applicable also to our seventh-chord. And here, again, a device which already has been made familiar in the field of the concordant proves equally valuable in the field of the dissonant:

Again our harmonic structure is unaltered; again the same elements stand before us; and yet, by taking no more radical step than altering the *order* of the three upper tones, additional variety and flexibility have been purchased. And when we combine these

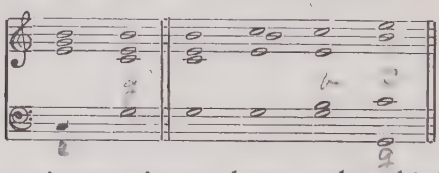
two principles of dispersion and changed position we further extract from our one seventh-chord its hidden richness:

But, as we have already seen, a still more dramatic power resides in the third of our principles, inversion, and that third principle must now be applied to our seventh-chord.

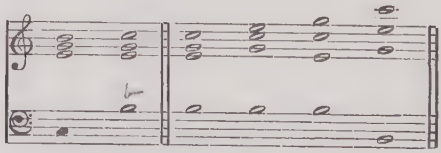
It will be remembered that there were but two separate inversions of our concords—namely, the first inversion, in which the bass moved up to the second tone of the quartet, and the second inversion, in which the bass moved up to the third tone. In chords of the seventh, however, we have three inversions, because there are four distinct and separate tones in such discords. No new rule is involved in this increase; as before, the bass merely moves up to one of the elements of an established harmony, while the note to which it moves is abandoned elsewhere. The three inversions of our seventh-chord may well be illustrated, however, to the end of clarity, and therefore we shall take these three inversions in order, regarding each one in turn—first in close position, and

next in various degrees of dispersion. The first inversion of our seventh-chord hence follows:

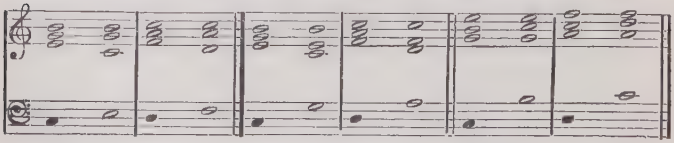
Similarly, we reach our second inversion by raising the bass to its next position, a third higher:



And yet again we raise our bass another third higher, placing it on its next and last position, producing our promised third inversion:



And now, finally, for the sake of greater clarity, we begin to move up the C scale to other discords:



First inversions Second inversions Third inversions

For it is important to remember that *every* tone in the C scale has its seventh-chord, and that the principle of inversion (as well as that of dispersion and of changed position) is applicable to the discord based upon it.

Confining our attention, as we have done, to inversions of seventh-chords in the C scale is to withdraw our gaze from other scales and their own seventh-chords. And such a limitation of our field is perhaps unfortunate. Faced only with the specific illustrations we have been using, the reader is not confronted by that veritable wealth of dissonance which they symbolize. On the other hand, once he comprehends the simple laws just expounded, his imagination will supply the deficiency. And it is to be hoped that he thereupon will not fail to do something which is as important as being aware of immense variety—which is realizing that that variety is only the blossoming of a few principles. For unity has again garnered the multifarious. If a single chord of the seventh and its three inversions give rise to a multitude of discords, not less surely may that multitude of discords be gathered in again under the simple law which gave life to our few examples.

Two words, "unity" and "simplicity," have been used very often in these pages. Harping on these words may have tired the reader. If so, he must blame music and not the author. It is quite possible to make music appear complicated; to make music compli-

cated is quite impossible. Its laws are few in number, and all are simple. And there is perhaps no more imperative moment for realizing this significant fact than the present one. Why? Because we have now examined the anatomy of music. Save for a single law remaining to be looked at, all the structural principles of all music have been studied. Nothing therefore remains, as far as the formal construction of music is concerned, barring a single principle already mentioned—to wit, suspension.

Hoping to secure a deeper insight into the art of tone by conning the pages now in front of him, the reader may be discouraged to learn that the chief characteristics of that art lie behind him. And it must be confessed that a certain measure of discouragement is incurable: any reader who has hoped to master musical theory through these pages is doomed to large doses of disappointment. For, as we have already said, the present work does not pretend to teach musical theory. The most it can hope to accomplish is to stimulate a wider interest in that study, and to instill the necessary confidence for undertaking it.

In all other respects, however, dismay would be wholly illegitimate. Not only are the structural laws of music few and simple, and of prime value even if viewed only in outline; their incorporation in actual music, as we shall see a little later, can be indicated in a reasonably brief manner. The anatomical laws which we have looked at are no academic prin-

ciples to tickle the intellect; they are part and parcel of the existence of real music; they are integral features of the very compositions to which we give our homage. The reader may therefore rest assured that some of those very compositions will be scrutinized. He will see, by probing them carefully, how the structural laws already viewed underlie them. And he will discover, no matter how lifeless these laws may seem at present, that the vitality of the tonal art depends upon them.

Similarly, when we come to the *activity* of these simple tonal structures, he will see again how the rules of counterpoint or polyphony, barren though they may likewise appear, become fertile in actual music, and indeed engender it. Consequently there is a good deal of ground left to cover. We have not done yet even with the anatomy of music; one final structural law—suspension—must be examined.

It is nevertheless proper to remember at this time that, although suspension itself is a species of discord, the discords which we have found in our seventh-chords constitute the greater part of the musculature of music. On them rests the honour of keeping a musical organism hardy and athletic. On them, to a really surprising extent, falls the task of saving music from the fate of flabbiness.

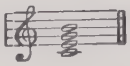
To suppose that these chords of the seventh—either in fundamental position or in inversions—compose a literal half of the body of a piece of music

would be an erroneous deduction to draw from their importance; muscles do not make up the bulk of bone and tissue. It would also be an error to imagine that one chord of the seventh is like another chord of the seventh, in the sense that all seventh-chords boast the same value. We should never forget that these tonal fibres are of different lengths and have different functions. Some chords of the seventh—one in particular, called the dominant seventh—have unique powers which their companions cannot imitate. Some chords of the seventh are major, some are minor:

And one particular seventh-chord, the dominant seventh (known as such because based on the fifth of any scale, which is the dominant) has such a mighty role to perform that the labours of all other sevenths seem almost trivial. For as there are some

seventh-chords, like the unstriped muscles in our hearts and stomachs, which humbly do their duty in hidden places, so also are there other seventh-chords, like the great tendons of the legs and arms and torso, which flex themselves with conscious pride in being warriors, ready for any task that may be set them. In fine, we must never forget that variety stands before us in all these discords; never can a single muscle, laid out in a glass case, begin to suffice us.

Nevertheless, if we but remember that we are still only in the laboratory of music, a single muscle will tell us much of its companions; for what it is made of and the way it works are facts which transcend its private business. It is thus quite as true as it is important that a single chord of the seventh, based on the first tone of our C scale, and selected for a mere illustration, is, despite its brevity, universal:



CHAPTER VI

SUSPENSION AND ANTICIPATION

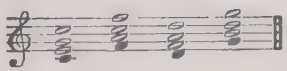
Compared with chords of the seventh, suspensions do not bulk heavily in music; speaking both absolutely and relatively, indeed, their magnitude is decidedly modest. In musical importance, however, suspensions must be given a high ranking. For a suspension performs two different feats, both of which are easily of the first order: (1) it increases the independence of our four voices, thus introducing us (as we shall see later) to the *functions* or the physiology of our musical body; (2) it also binds those four voices together, thus tightening up a tonal structure to which concords gave substance and seventh-chords vigour. The latter use of suspension—suspension regarded as a device for knitting together all the parts of our musical organism—is the one chiefly to be studied in this chapter.

Anticipation, as formally defined, is not only different from suspension, but is opposed to it; nevertheless, since the one is the reverse of the other, they are bound together closely as logical opposites. It will hence be found, after we have studied suspen-

sion, that anticipation offers very few difficulties. We therefore turn first to the foremost of these two devices.

As the term indicates, suspensions are tones which have been suspended, or held over, or continued from one harmony to its successor. And this practice of suspending tones foreign to a succeeding harmony is, as we have just said, a very important one. The manner in which we select them, and the method by which they pass over or (as musicians say) *resolve* into a succeeding harmony, will be carefully explained and illustrated in a few moments. It is first necessary, however, to examine the mere retention of a tone, inasmuch as retaining a tone common to two harmonies, though not an example of suspension, is also valuable in giving compactness to our tonal body.

For example, suppose we take four separate concords and decide to have them succeed one another in a certain order—say, those based on C, F, D, and G in the C scale. The succession of these in their most primitive form is hardly effective:

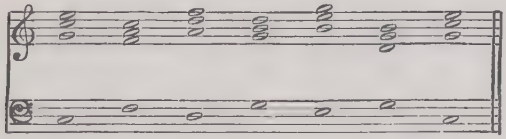


To be sure, there is nothing very offensive in this series; on the other hand, there is nothing that can be called very musical. The harmonic effect, for want of a better word, is "lumpy." Let us therefore try

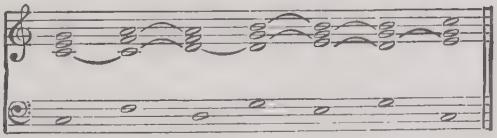
the experiment of taking these same quartets and changing the position of the voices slightly, also dispersing them. Before one can say Bach one has the following:

Now it is plain enough that the original succession of concords stands unaltered; but the musical effect, if not quite astonishing, is certainly superior. Why? For two reasons. The first reason is that those voices which moved at all have moved to the *nearest* tones in the next harmony; the second reason is that, wherever there were tones in common between these harmonies, there was *no motion at all* of those voices; it was simply the retention of that common tone which accounted, in conjunction with the minimum motion of the moving voices, for the greatly increased compactness of the progression. In other words, our musical effect was augmented just because, and just to the extent that, we practised as much simplicity as we were able to.

The retention of a tone common to two or more successive harmonies is thus of very obvious value; and throughout all the harmony student's exercises this principle is honoured continually. It does not diminish the variety of the harmonic succession, nor does it weaken the contrast between successive harmonies; and yet it does most emphatically invigorate, solely by simplifying, the series. If the reader compares



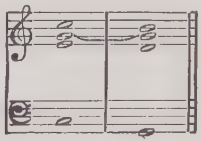
with the same series simplified, as follows:



he will not fail to remark at once the signal improvement which has flowed directly from this principle.

Suspending a tone is similar to retaining a tone, as already observed, in that every suspension is a retention. But there is this important difference: the *retained* tone is common to two or more harmonies, whereas the *suspended* tone is a natural element of one harmony only and, though heard in conjunction with a succeeding harmony, is a foreign or dissonant element within it.

For example, suppose we wish to connect the concordant quartets founded on C and G; then G, which is a natural element of both quartets, is retained in the same voice (the alto) in order to bind the two harmonies together, so:



But this particular harmonic progression, whilst admirable in point of simplicity, is perhaps felt to be a trifle too mellifluous. For one reason or another the minute organism we have just created may be too flabby for our musical purpose. We wish to season our musical porridge; we wish to sharpen the contrast between two flavours; we wish to savour fully the difference between them. How can we do this? By suspending a tone which is *not* common to the two chords, resolving it only after we have secured our desired contrast, so:

The foregoing illustration exemplifies the whole law of suspension and resolution; and, besides doing

this, it offers the reader a representative taste of a musical experience which (familiar though it doubtless is) has heretofore been invariably a vague experience. But whilst this brief description of a suspension has already enabled the reader to name a particular experience and recapture it—one of the chief virtues of musical theory—the versatility of this simple law is but ill exposed in the single illustration above selected. Recognizing the worth of a single phenomenon, we wish to search out a broad rule which stands behind it. We therefore ask two questions: (1) Can we suspend *any* tone and resolve it? (2) Which tones are peculiarly subject to such treatment?

In the broadest sense, any tone whatever *can* be suspended—and this is the answer to our first question; but it is nevertheless true that two tones are particularly valuable as suspensions, and these are hence the tones which we shall treat of. One of these was used in our illustration, and is called *a suspension of the fourth,* taking its name from the interval between it and the bass of the harmony it resolves into (that is, C, the suspended tone, was a fourth above the bass G, reckoning this interval as if it lay within the compass of an octave). The other tone is a ninth above the bass (or a second, if we reckon within the octave) and gives rise in turn to *a suspension of the ninth*—our second suspension of chief importance.

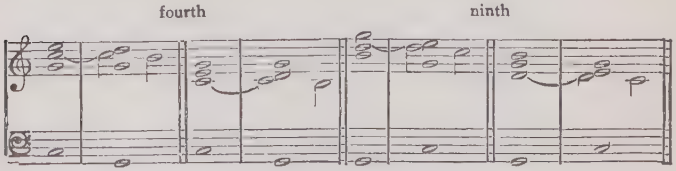
These two suspensions therefore in essence are as follows:

Suspension of fourth

Suspension of ninth

The law of suspension is very much more comprehensive, however, than it might even yet appear to be; for our suspended tones can appear in other voices besides the soprano; they can also appear in inversions; they can appear in seventh-chords as well as in concords; and they can appear even in the bass itself, in which event the interval is reckoned between the bass (the suspended tone) and the *root* of the harmony it resolves into.

Taking these variants in turn, we first see suspensions of the fourth and ninth in the tenor and alto, as follows:



Next in order come suspensions of the fourth and ninth in inversions (remembering that in all cases of inversion our interval is between the *root* and the suspended tone), as follows:

And finally, coming to the same suspensions in the bass, we see our simple law continuing to extend its empire, as follows:

* The small notes in parentheses are the roots of the harmonies into which the suspended tone is passing (resolving).

Nor are we obliged to halt even here. For it is possible to *combine* our two suspensions, and so further sharpen the difference between the harmonies that succeed one another. An illustration of these combined suspensions, or *double* suspensions, is hence the following:

double suspensions

How important, how fundamentally simple, and yet how rich in possibilities is this principle of suspension the foregoing brief illustrations will have made evident, or at least will have helpfully suggested. And when we reach the analysis of actual music, as we shall in the chapter to follow, the reader will obtain a still clearer idea of the latent power of the little law here examined.

So much, then, for this device called suspension. Its counterpart, anticipation, must now be glanced at. Nor will more than a glance prove to be necessary, for anticipation hardly needs more than a definition.

As this term for its own part suggests, anticipations are tones which anticipate the harmony that is to follow. Actually they are seldom of great importance—they certainly do not vie with suspensions—

but they are still used with great effectiveness upon occasion.

The simplest type of anticipation is the following:

Here the soprano descends from D to C, reaching C ahead of the bass and suggesting the entire C chord before the other voices are ready to sound it. And this procedure, it will be obvious, is a simple one; indeed, in many cases, only modest ends are served by the use of it. In the majority of cases no heroic demands are asked of it or put upon it. It is merely used to intensify a harmonic contrast, and yet not invoke the greater conflict which a suspension gives.

On the other hand, since no principle in music is really a paltry one, once we learn to make use of its latent powers, anticipations can also serve us very nobly. Therefore, as a perhaps unusually striking demonstration of this statement, we shall quote a classical instance of anticipation. It occurs in so dramatic a musical passage—or, more truly, the passage is extraordinarily dramatic because anticipations have been used with such subtlety—that greater effects through smaller means are a rarity, even from the

hand of a master. The passage referred to occurs in the third *Leonore* overture of Beethoven. Since this work is recorded on the phonograph, the reader is urged to procure it, listening attentively for a really astounding phrase which appears shortly after the second famous trumpet-call (in other words, about

three-quarters of the way through the composition). It is one of the great happenings in music. Only seventeen measures there are, and all are compounded of anticipations—and yet Beethoven himself rarely approached it in point of poignancy and Gargantuan vigour. Nothing less than hearing this remarkable phrase makes it believable, but for purposes of direct comparison we have quoted part of it. Here is what the principle of anticipation can accomplish when we begin to believe that musical wonders may be wrought—as they always are wrought—in the simplest manner.

With this citation, after which most other uses of anticipation would appear feeble, we bring to a close our survey of the two final features in the anatomy of music. But we end more than our survey of these two features, in strict truth, for we have now scanned the entire structure of the art tonal. As far as the structural principles of music are concerned, we have the whole body of the art at last before us.

Needless to say, we are not standing face to face with music in the sense of confronting the very presence of its existence. No scalpel has ever yet cleaved a mystery. Nevertheless, we do stand in the presence of that structure into which all tonal mysteries at last shape themselves. And if it is well to realize that great matters have necessarily escaped analysis, we dishonour the object which we have scrutinized if we decry our findings on the grounds that they were simple.

The life-blood of the art—time—does not yet course through this structure which we have analysed. Though the skeleton has the power of motion, though the four limbs have covered themselves with tissue, though the whole organism is complete as a piece of architecture, as yet there is no throng moving within it. It is a tomb, so to speak, and not a temple. And to be struck by this absence of vitality is an emotion which we should not try to inhibit. In recognizing fully what the anatomical laws of music do not yield us, we shall be conferring on its physiological laws—laws which we later come to—their due importance.

It is therefore inevitable that the examples of actual music in our next chapter will seem to escape their harmonic structure by overflowing it. For some time yet an abyss will confront us: living music is on the yonder side of it, and we cannot reach it. The compositions we know, and love, and listen to in default of actually hearing them, appear remote from those principles we have been studying. And even when we have probed them still more deeply, thrusting our hand into the side of some tonal creature, touching the very heart that lies warm and quivering under our finger-tips—even then the life of music will remain elusive, slipping by under our touch like a pulse-beat.

But this ultimate secret of animation and of imagination, though it never gives itself away when we ask it questions, still does incorporate itself invariably in solid answers. In every musical composition it is

become incarnate; and if we study those bodies that it lives in we shall come as close to its nature as man is able to come.

Those great structural laws, therefore, which have been outlined in the preceding pages are not the entire secret of music. But music still inhabits those very structures; music is never discovered save within them; music never reveals its vitality save by methods which are the simple functions of those same structures; and we must therefore search out the familiar if we would seek the alien.

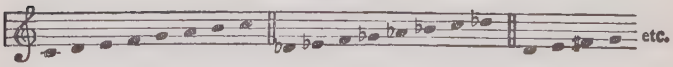
Without that routine discipline which this book is urging upon every reader, the ensuing chapter may prove a little troublesome. The untrained ear will often parody what it listens to; the untrained mind, especially when not assisted by those helpful mnemonic signs called figured basses,* will also find itself

* A great mystery is commonly made of figured basses, whereas the sole mystery is why they are deemed mysterious; for the figures placed under a bass note are simply the intervals to be sounded above it. Thus the figures for a common concord based on C are 8-5-3 (reading downward), since the tones composing this concord (C-E-G-C) are a third, a fifth, and an octave, respectively, above the bass. The reader who will step to the piano will at once see this. As exactly the same principle is behind the figuring of all basses, whether the chord is in fundamental position or is an inversion, the absurdity of making mysteries here is promptly evident. Thus 8-6-3 (reading downward) or 3-6-8 (reading upward) is the full figuring for the first inversion of a common concord; since these figures are commonly contracted simply to the figure 6, which is the significant interval, we call this a chord of the sixth and so figure it; similarly, 6-4 is the figuring for the second inversion, and so on. Of course, to memorize these figures requires practice; but the principle itself is obviously so simple that it can be presented—and grasped—in a short foot-note.

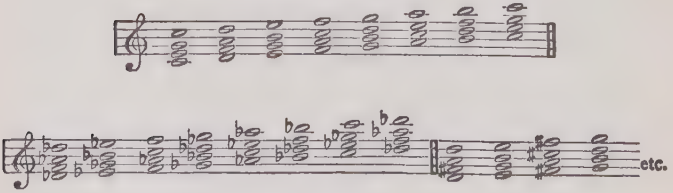
under certain handicaps. It is inevitable that the prospective student of theory should occasionally be confused by technical details which, so it would seem, rear their heads with the sworn purpose of scaring some one. That the following chapter may nevertheless prove as helpful as possible under the circumstances, the laws so far examined are codified below in condensed version. They are an anatomical guide, not only to the illustrations in our next chapter, but also to all compositions wheresoever.

THE ANATOMICAL OUTLINE OF MUSIC

THE SPINE



THE FOUR LIMBS

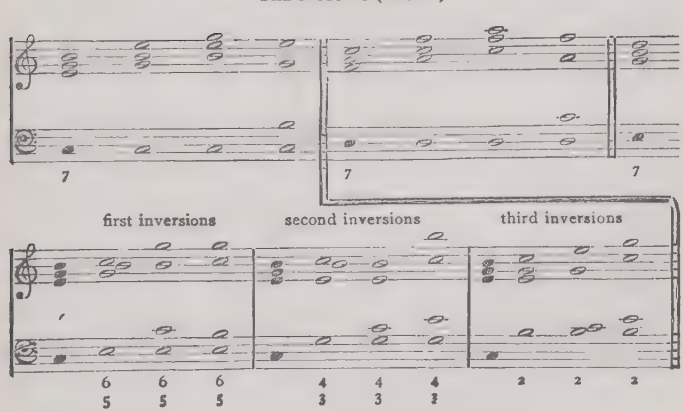


THE FLESH (inversion)

first inversions

second inversions

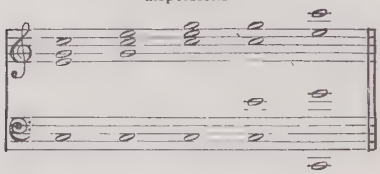
THE MUSCLES (discord)



THE FRAME IS ORGANIZED

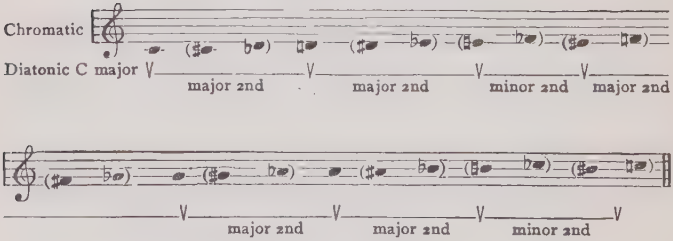
suspensions

dispersions



THE WELL-TEMPERED SCALE

(omitting ♯♯ and ♭♭ equivalent)



In der Beschränkung zeigt, sich erst der Meister!

CHAPTER VII

THE ANATOMICAL ANALYSIS OF COMPOSITIONS

The story is told by Harold Bauer of an earnest student who once came to him for pianoforte lessons. The student confessed that he never had had a lesson, having taught himself everything from the very rudiments, but now was determined to become a virtuoso. A few lessons, so he appeared to think, might prove helpful.

Seeking to discover the applicant's talents, Mr. Bauer genially invited him to play something. At once the student sat down before the keyboard, announcing in a business-like manner that he would play Beethoven's "Moonlight" Sonata. Forthwith he broke into the following:

Thunderstruck, unable to credit his ears, the audience of one listened to a dozen measures. Then he strode—or staggered—to the immediate scene of the outrage. "For heaven's sake," he exclaimed, "what are you doing! Why, you're playing in the key of C major, and the sonata is in the key of C-sharp minor!"

"Well," exclaimed the student in turn, visibly aggrieved at the sudden interruption, "of course I am. I know that. I told you I had come to you for polishing lessons."

"Polishing lessons!" The *maestro* stared at the novice. "Will you kindly tell me what you imagine 'polishing lessons' have to do with the proper signature of a composition?"

In equal astonishment the performer stared back at his erstwhile audience.

"Why—well, of course—well, naturally," he stammered, "I was playing in C major because I always understood that sharps and flats are put in later on with the expression."

The tale is almost too funny to be accredited, but it is not quite too preposterous to be impossible. And for this reason the anecdote has been recorded. Few persons may carry their naïveté such a distance; on

the other hand, the C-major scale is very widely regarded as somehow or other a unique scale, simpler in construction than its companions and devoid of their colour and tonal richness. Numberless music-lovers are thoroughly convinced that a "sharp" key is brighter than a "flat" one (though it would gravel them to explain how the scale of C-sharp major, composed of identical tones, differs in quality from the scale of D-flat major). And starting from a superstition of this order leads, by a series of fatally easy steps, to the belief that accidentals are a mere adjunct in music—are, so to speak, plums stuck in a pudding to make it richer.

Now, it is true that certain keys are desirable in orchestral music, or indeed in any music performed on stringed instruments, for the "open" positions make for ease as well as brilliance. Certain signatures are also desirable in piano music, in many cases, because a passage may prove mechanically awkward in some foreign one; the actual tone-quality would therefore also suffer. But save for these practical distinctions, there is no difference between one signature and another. And the point is stressed strongly because musical nomenclature is lamentably misleading. We speak, for instance, of F and F♯ as if the second note were a mere modification of the first one, whereas the reverse is equally true on the piano keyboard: F♯, if modified itself, becomes F♮. More pertinently, we think of the C-major scale (that is, the

scale confined exclusively to the "white" notes) as simpler than all other scales for the reason that it involves no accidentals; nevertheless, it is a mere convention that occasions this circumstance: the note we call C may with equal propriety be considered a "mere modification" of the tone immediately below it (or above it), and thus is as truly B♯ and D𝄫 as C♮.

If the reader does not need this explanation, he perhaps will pardon it; for a great many persons do need it badly. And the whole matter of signatures now becomes important, because heretofore we have limited ourselves to the C scale, although few of the following illustrations will be in it.

There are, as we have just said, certain practical reasons for choosing certain tonalities, for the question of pitch in vocal music is important, taking the place of various mechanical considerations in instrumental music. There is also the question of a composer's sentimental attachment to certain signatures, which may be due to a variety of causes; for example, if he has conceived a work in one signature, he dislikes having to think of it in some other. But if we may scoff at a sentiment of this nature, the very irrelevance of the affection deprives us of any sound reason for altering the key selected. Consequently, we shall not transpose harmonic structures into C major or C minor, which we might very well do in most cases, but shall prove our utter indifference by accepting whatever scale we may be given. Specifically,

we shall leave Beethoven's "Moonlight" Sonata in C-sharp minor, though it might just as well be in C minor, in D double-flat minor, in B-sharp minor, and so on.

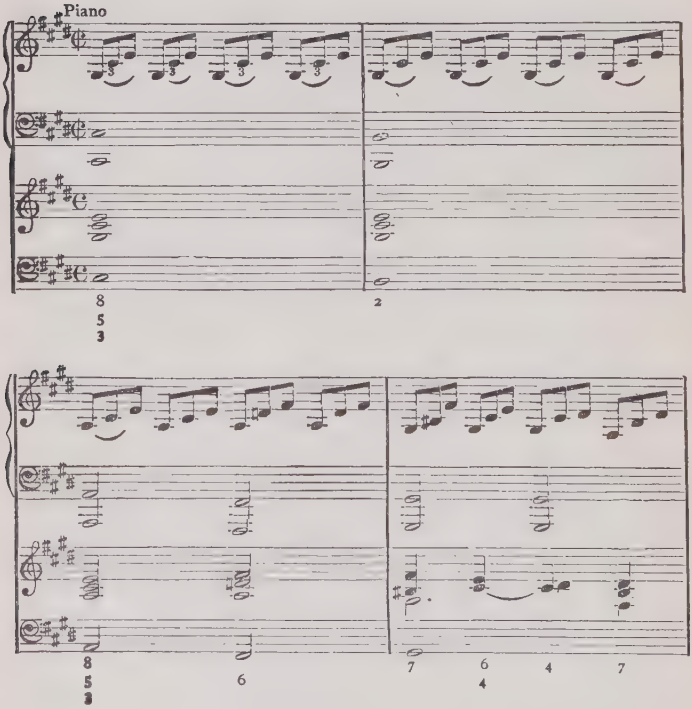
With so much said by way of introduction, we are ready to analyse actual musical compositions, reducing them to their structural outlines. And when we come to do this nothing surprises us so greatly as the simplicity, the nearly incredible simplicity, of the harmonic shape of these organisms. We supposed that great music was complicated; we find that great music is defiantly simple. We supposed that strange and unfamiliar harmonies lay at the bottom of our wonder and ecstasy; we find that our wonder and ecstasy, if not caused by harmonic simplicity, are at least associated almost invariably with it.

And in a thousand different manners, in a thousand different compositions, this is demonstrated. Let us turn to the "Moonlight" Sonata, let us turn to any sonata by Beethoven, let us turn to any composition at all by any one of the great music-makers in history —symphonies, string quartets, choruses—and see for ourselves, hear with our own ears, the simple laws of music's anatomy in operation.

Does Beethoven establish an unforgettable mood in the opening of the sonata just mentioned, does he overwhelm us with majestic woe in the funeral march of another sonata, by conceiving harmonies recondite and extraordinary? Not here does he do so, and

not at any time do men comparable do so elsewhere.

Mark the simplicity—the incredible simplicity, if we imagine that eloquence is complexity—of the harmonic structure of his Sonata in C-sharp minor: *



* As this sonata is phonographically recorded, the reader is urged to conduct the interesting experiment of *simultaneously* playing the harmonic structure on the piano.

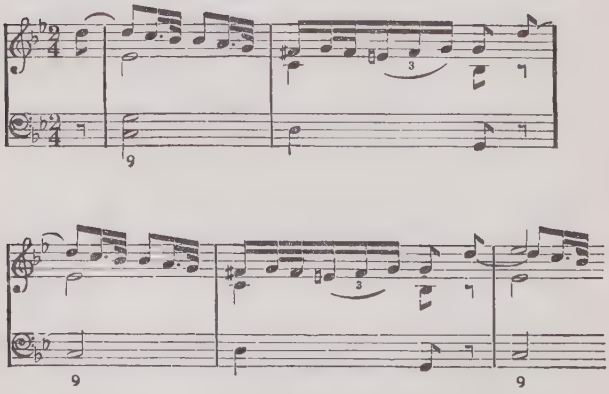
Again, take one of the most celestial of all Beethoven's slow movements—the *Adagio* from the last of his piano sonatas:

Here, of a truth, is pure eloquence; here is such tranquil radiance as might hover over the language of angels; yet here is also such harmonic simplicity as may be found in the first-month harmony exercises of any student.

And almost as much might be said of the *Andante* from his "Appassionata" Sonata. Since this sonata has fortunately been recorded, let the reader turn to the tragically lovely movement just mentioned. And then, if he is so minded, let him rub both his ears in astonishment that seven common con-

cords, one seventh-chord in inversion, two inversions of a common concord, and one suspension of the fourth should alone conspire together and frame such beauty:

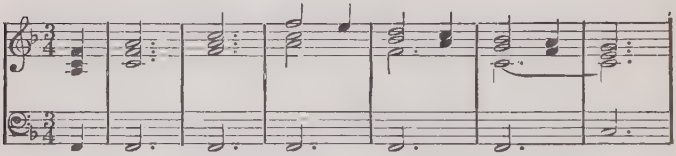
Or, as illustrating the repeated use of a suspension, let us open our ears to the *Romanze* in Schumann's "Faschingsschwank." Here, like the weary clang of a cracked bell, a mere suspension of the ninth in alternate measures touches a dream with remembered pain, a smile with anguish:



We have been speaking so far of slow movements; and it may hence be imagined that the examples heretofore cited are special pleading, holding true only of music in stately measure. But drawing such a conclusion would be an error. Indeed, harmonic simplicity is generally more pronounced in rapid movements than in slow ones. If the reader will turn to another Beethoven sonata already quoted (the *Presto agitato* movement from the "Moonlight" Sonata) he will be almost shocked by the discovery awaiting him. In the first *eight* measures there are no more than *five* different harmonies, and every one is a familiar acquaintance:

Still again, turning now to orchestral compositions, we find that our anatomical laws remain constant. True enough, in orchestral music there are commonly more than four voices sounding. There are doublings in various octaves very often; there is the additional colour or *timbre* of diverse instruments. Nevertheless, even here all activity is comprised essentially within four voices; and again, as always, the

harmonic structure which they belong to is essentially simple:



Nor is the foregoing structure, which underlies the *Presto* of Beethoven's Seventh Symphony,* simple merely for the reason that it is Ludwig's. Any other master's voice sets the same lesson. Schubert's great Symphony in C major will tell us the same story:

†

* Like all Beethoven's symphonies, this is recorded.

† From the *allegro* in the early part of the first-movement. This symphony is available on the phonograph.

So will Brahms in his E minor Symphony:

So will every other competent composer, including Mozart: *

For harmonic simplicity is no fashion affected by an individual or a decade; it is the foundation of every composition that can be called music; it is the substructure of every work that achieves eloquence.

In recognizing this fact we do not need to deny that a composer may avail himself of considerable latitude in the choice of the harmonic material he works with. He may incline toward the serene and concordant; or he may incline toward the strident and discordant. He may even go so far in the latter direction that his cacophonies give the first impression of chaos. But when we come to inspect them carefully, we always find—supposing the man is a competent composer—that his discords in reality

* From the famous "Jupiter" Symphony, which also has been recorded.

are very orderly; they may preponderate in rare instances over concords, but they seldom do more than strike an average a little higher than the classics sanction. And, finally, irrespective of their literal frequency, those discords which he does use are only those discords which have been illustrated in the previous pages. Save in the rarest instances, in fine, the anatomical outline which we have examined suffices him.*

It is perhaps needless to add that perfect nonsense can be spoken in monosyllables. Simple speech can serve fools as well as wise men. Mere harmonic simplicity, in other words, does not guarantee that high eloquence which marks great music. It is entirely possible—in fact, the thing is being done very often—to use nothing but two or three concords and two or three discords and produce a composition considerably flatter than a last-week's pancake. None the less it is also possible for the same harmonic material to issue in music of the highest and finest order. And, as a matter of instructive fact, most music of that

* Two additional species of discord might be mentioned, namely, pedal-point and chords of the ninth. Pedal-point (often called organ-point) is a series of harmonies progressing independently of some single, persistent tone which sounds throughout this harmonic series; the pedal-note is commonly not a formal element of many of the harmonies sounding against it. Respecting chords of the ninth, no new principle is involved in their formation, inasmuch as they grow out of chords of the seventh, being produced by adding a third to any seventh-chord. Chords of the eleventh and thirteenth are similar extensions of our seventh-chord. There is no chord of the fifteenth for a reason that the reader may discover privately.

type does thus originate. Instances abound in every quarter: the greater a composer is, the more likely is he to hew to the sparse and the simple. Examples of the most extreme asceticism are unusual, but two famous ones may be cited in illustration. Both, it so happens, are from Beethoven. Near the beginning of the *allegro* section in the third *Leonore* overture, sixteen whole measures are devoted to single discord (a seventh-chord over a pedal-point on the tonic). Again, at the beginning of his Ninth Symphony we find fifteen whole measures in which only a single harmony appears, and it is a concord!

Confronted with the foregoing evidence, and also with the implications of our representative illustrations, the reader will wish to know how such modest harmonic structures become so versatile. He has come to appreciate the essential simplicity of those structures; nor can he deny that principles which have been shown him in the laboratory are actually incorporated in the structure of the world's music. He cannot deny what he has seen happen and has heard happen. There is a gap, nevertheless, and it is probably troubling him. The anatomy of a musical organism is certainly simple; dodging that fact proves quite impossible. But between this structure in tone and actual music, there still seems to be an abyss that is impassible. And the impassible is as plain as the impossible. *What accounts for the appearance of the music?*

This very natural question needs two answers.

The first answer, already touched on in a previous chapter, must remain what it promises to remain always—a vague one. What it is that transmutes common speech into literature is something we cannot pin down with a forefinger. The man who knows what it is (as Kant once said in another connexion) is the very man I want to meet as soon as possible. We cannot say beforehand why certain combinations of syllables will stir us. We cannot foretell eloquence, and we cannot fathom it. Recognizing the experience must suffice us. In this respect all the arts are identical.

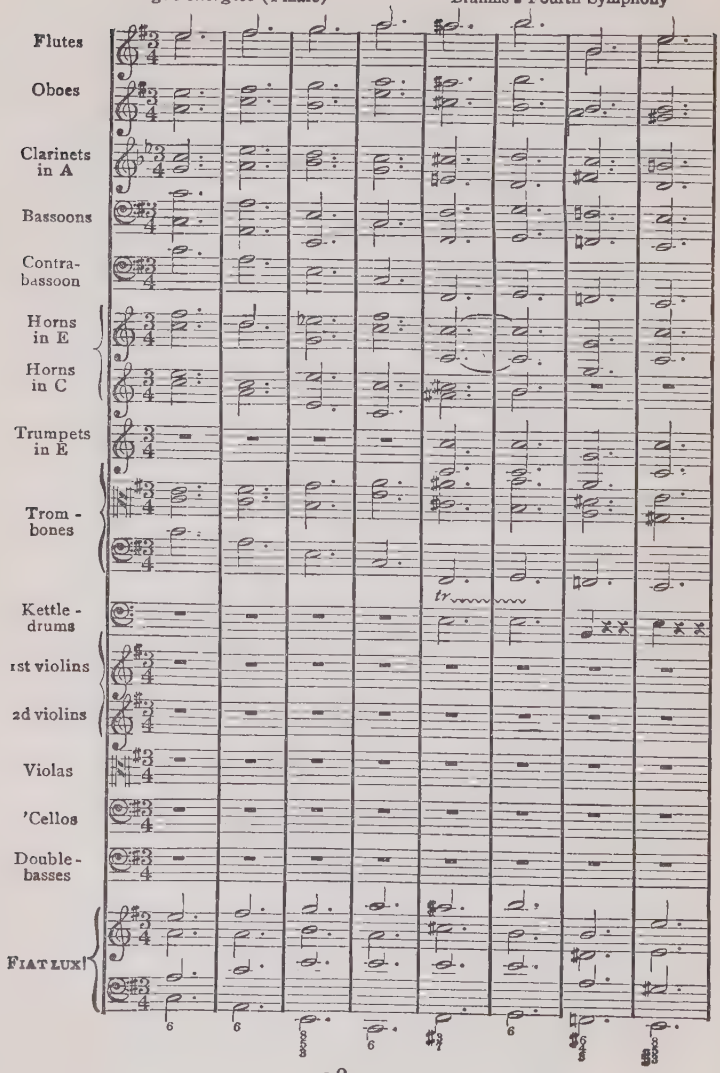
The second answer, fortunately, is more helpful —as we shall see in the pages to follow. For when we come to counterpoint and fugue and canon—that is, when we come to polyphony, or to the functions of the tonal structures we have now examined—we come measurably nearer the vital secrets of music. Although the incalculable and the incommensurable may still baffle us, a great deal that now seems dark will grow lighter.

In counterpoint, for example, we shall learn how polyphonic motion is developed and elaborated out of a very simple thematic statement. In fugue we shall become familiar with the basic features of this mode of imitation which, for all the rigours of its manner, is very far from being a cold game of the intellect. In canon, again, the dramatic

potentialities of strict imitation become manifest. And finally, in our study of musical forms in general, and of the sonata-form in particular, we attend the marriage of tonal laws with musical passions.

But if this second phase of our outline is important—that is, if the physiology of music helps us to understand how anatomy passes over into life and action—the structures which are so vitalized are not trivial. They are, if you please, only a framework; but they are, whether you please or not, the very habitation of all creations in music. Attuning our ears to this fact is especially imperative at this time, since we are now taking leave of this subject. For we ourselves, as a matter of convenience, may leave the anatomy of music behind us; music will not follow our custom. Always, beneath all activity, underlying all the separate adventures of separate voices, the tonal structure which we call harmony stands before us.

And it stands before us, not in the works of one or two composers only, or in compositions of some particular nature. Brahms and Schumann and Wagner, no less than Bach and Haydn and Beethoven, are witnesses to its perpetual presence. Whether the work be grave or gay, set in one key or in another, arranged for the piano, a string quartet, or a symphony orchestra—there, always, is our skeleton of four voices:


Flutes
Oboes
Clarinets in A
Bassoons
Contra-bassoon
Horns in E
Horns in C
Trumpets in E
Trom-bones
Kettle-drums
1st violins
2d violins
Violas
'Cellos
Double-basses
FIAT LUX!
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CHAPTER VIII

POLYPHONY: THE PHYSIOLOGY OF MUSIC

The earliest developments in music—one might more properly say, all but the very latest developments in music—were independent of a harmonic structure as we now know it. The individual voice, not a community of tones, was the focus of the musician's zeal and affection; and this curious attitude was so prevalent throughout a number of eras and a variety of cultures that we may name it a world-wide attitude and even (if the stars forgive such boasts) a universal one. In India, in Persia, in China, in Assyria, in Egypt, and more surprisingly in Hellas itself, the harmonic sense was virtually non-existent. Until the beginning of the sixteenth century certainly, and until the middle of the seventeenth century admissibly, men's interest in the "concourse of sweet sounds" was a random interest. For the art of music, such as it was, was adventitious. The song flourished; but the symphony did not even languish, being nowhere; and if the lyre had several strings, plucking them simultaneously would have been

deemed the blunder of a careless hand rather than the groping of a musical mind in search of concords.

What men desired, if we may deduce their desire from their creations, was not an art in tones; it was an occasional piece of melodic decoration; it was a series of pleasant sounds that should perfume a number of alien fancies. As a vehicle for poetry; as a rhythmic wave which the dancer could cavort in; as a fragrant tide wafting a lover's voice to his lady's window; as a stream on which a liturgy could be floated; as a means of enhancing language, in fine, or as an acoustical device, pure and simple—this, then, was the appointed career of the world's music. And though we were to consider that career no ignoble one, we scarcely can deny that it was a humble.

The subordinate position which music held amongst the arts, until at least the middle of the seventeenth century in Europe, has been commented upon in an earlier chapter. The phenomenon is deserving of repeated comment. No adequate explanation of it has been forthcoming; and, so far as the writer knows, no man has been appropriately amazed by what followed. For what followed was unique in æsthetics. Within a period of scarcely more than two hundred years—Bach and Handel both were born in 1685 and Brahms died in 1897—an art which, for twenty centuries, had served as no more than a court flatterer threw off the motley, rose up to its full stat-

ure, and not only ascended a throne, but built an empire.

How much of this astonishingly rapid turn in tonal affairs must be attributed to the chance appearance of some great musicians, whose births were huddled together in two centuries, and how much of it is due to other causes, no one is able to determine. The distribution of honours is never easy. One may hazard the guess, however, that—as we have already suggested—the general abandonment of many modes, and the further limitation of musical material to the well-tempered scale which Bach fought for valiantly and prophetically, deserve several shining guerdons between them. Certainly not the least part of Bach's genius was his intransigence in this apparently mechanical matter: he knew and announced, whereas his forerunners only suspected and whispered, that every art meriting the name calls for artifice, and that, as Burke later had it, freedom is enjoyed only when it is limited.*

Now, the limitation of musical freedom is of three varieties. The kind we have just noticed is one variety; homophonic or harmonic treatment, circumscribing the separate voices, is another variety; and polyphonic or contrapuntal treatment, sacrificing the group to the individual, is the third variety. As the latter—practised to some extent before the other two

* Regarding various technical obstacles to the development of music, the reader is remanded to the Appendix.

kinds of tonal discipline were fully formulated—is what we are here naming the physiology of music, a rather curious zoological paradox is forced upon us —namely, the physiology of music came first, its anatomy afterwards.

In one sense, of course, this is absurd. A structure normally comes before a function; before there can be digestion, there must be a stomach. And yet, even within the domain of strict biology, we find no dissimilar paradox—namely, the inability of an organism to grow a stomach during its early career unless it somehow first manages to take in nourishment. In other words, the old hen-and-egg conundrum invades music.

Furthermore it must be remembered that polyphony, for all that it preceded homophony, was a pretty modest kind of physiology during its early history; and it continued to remain so till the tonal body had developed considerable substance. Put otherwise, there were plain foretastes of polyphony before harmony had reached maturity or even adolescence. As early as 1322 Pope John XXII felt it necessary to issue a bull condemning the increasingly florid character of the mass, in which, so it seemed to the papal ear, "the voices are continually running to and fro in a licentious manner." And by the time we reach Palestrina in Italy and Purcell in England (who flourished in the sixteenth and seventeenth centuries), the independence of the separate parts had become tradi-

tional. Nevertheless, though all this is perfectly true, contrapuntal treatment was bound to be limited. It was bound to be limited because, until harmony had developed—until music had developed a harmonic structure—the activity of these separate voices was no true function of the very organism they were a part of. For the signal importance of polyphony does not reside in the mere indiscriminate motion of separate voices; it resides in the *coming to life* of a harmonic structure.

The genuine maturity of polyphony thus does depend on music's anatomy, or on homophony. And if there is any paradox here at all, it is only the familiar paradox of the activity of any body. Unless the four limbs are securely connected to the spine (and, through the spine, to each other), the mere existence of the bodily structure is impossible. But unless those four limbs do also move with a great amount of independence, the very life of that structure is impossible.

Now, at the present time polyphony is unpopular. Modern composers are more intent on adding to the structure of music than on increasing the activity of that organism. The average music-lover likes a "tune," and demands one. In other words, he likes that very limited type of polyphony which is created by one voice moving with considerable independence against three others which are locked together in harmonic slavery. Moreover, the average composer is

quick to gratify this predilection. Nor is anyone asked to believe that this limited type of polyphony is ignoble. It is mere snobbishness to sneer at such treatment, which has its own peculiar uses and virtues. To suppose that a melody—the motion of a single voice—is something that appeals only to the untutored ear is to suppose something that the greatest musicians would smile at sadly. The eloquence of a single voice has proved tremendous; and it is often of such a kind as to make the oratory even of accompanying voices undesirable. This limited type of polyphony has hence entered into some of the greatest compositions. Indeed, nearly all music from Beethoven onward—all that merits the title music—is a mixture of the two different treatments. But if we recognize this fact, we must also recognize that certain unique advantages are derived from pure polyphony. And those advantages, in a word, are the ones we view, and study, and learn how to secure when we study counterpoint.

For contrapuntal writing, which accords *all* voices independence, is no criticism of other types of treatment; it merely is an extension and elaboration of the very treatment which was spoken of in the preceding paragraph. Instead of giving liberty to one voice only, we give the maximum of liberty to all four voices; this, in one sentence, is the definition of polyphony and its destiny.

How do we secure that maximum independence

of our four voices? How active can our organism become without doing violence to the harmonic structure we have builded? Such questions as these can be answered only when we reach—as we shall in the next chapter—the specific problems set the student of counterpoint. There the reader will be introduced to these problems and shown, at the same time, how the harmonic body already builded learns little by little to increase its functions.

But if he is eager to lay hands on that knowledge, as he is entitled to do, a few prior remarks are now in order.

Chief among these is a statement made already —namely, that polyphonic treatment is a limitation of harmonic freedom, just as homophony limits the activity of the separate voices. The statement calls for explanation, for in one sense it is very misleading. If it be taken to mean that the independence of our voices is secured at the expense of variety in the harmonies, an utterly false notion has been created. Let it therefore be said, as plainly as possible, that polyphony does not entail harmonic poverty. A polyphonic composition may make use of as many different harmonies as a homophonic. On the other hand, polyphony does (as we have said) limit the freedom of the harmonic sequence in this respect, which is an important one: the more independence we accord our separate voices—that is, the more

clearly we recognize them as *being* separate—the less attention, obviously, is given to common interests. It is true that those interests are always present. Just because our separate voices must yield continually to the demands of each other, there is a continual reflection in each voice of its companions' wishes; in other words, our harmonic body is still a controlling factor. But it is not less true that that harmonic body is the expression of the will of separate members; and to overlook the second point is as blind as to minimize or neglect the first one.

And one other previous remark may be referred to—namely, that polyphony at present is neglected.

This work is no diagnosis of musical diseases. To bewail the decline of musical composition is also foolish, for the literature bequeathed us by musical genius is ample to keep the world clothed in tonal beauty for several centuries. Persons who wring their hands in despair over the present scarcity of musical giants might better clap them in delight over a mighty heritage. The writer may yet be allowed to suggest that some of the feebleness of recent music is due to nothing more mysterious than the failure of musical organisms to take exercise.

No substitute for genius has been discovered. Studying counterpoint has filled no man with the divine afflatus. Nevertheless, whilst inspiration is indispensable, so vigour is also; and vigour no musical

organism truly has if its members do not indulge in activity, and if a well-knit tonal body fails to fill its lungs with the breath of life by functioning fully.

Be it never so beautifully proportioned, it is a dead body if it is nothing but a structure.

CHAPTER IX

COUNTERPOINT

If harmony is supposedly an esoteric subject, reserved for musical greybeards and tonal savants, counterpoint is wrapped in veils of seven mysteries. Not only has the average music-lover never studied counterpoint; he is not so presumptuous as to suppose that he ever would be able to study counterpoint. One thing only does he really know about counterpoint—that he will be just dashed if it is not something frightfully intricate.

The reader is hereby warned that counterpoint is not to be picked up over a week-end. He is also warned, with all due solemnity, not to imagine that the smallest measure of contrapuntal skill will be gained by reading—or even by re-reading—the present chapter. But he is warned no less, and with no less solemnity, against imagining something else equally foolish—which is that the amateur musician, the average music-lover, the ordinary attendant at a concert, is unable to study counterpoint and to grasp it thoroughly. Acquiring actual contrapuntal skill will depend upon native endowments, on the one

hand, and upon industry and patience, on the other. The longer a student labours on his exercises, naturally, the more fluently and confidently he will write them; for this is true of any study whatever. Nevertheless, no unusual native endowments are needed, either for the actual study of counterpoint or for a prior grasp of the principles which underlie it. No gigantic powers of concentration, no meteoric mind which skips debonairly through higher mathematics, no transcendental gifts of any nature are, contrary to popular opinion, called upon. All the subject needs is a student who is not tone-deaf, who loves music and not merely likes it, and who possesses moderate quantities of plain patience.

The study of counterpoint presupposes the study of harmony; and for this reason both the reader and the writer will find themselves at an occasional disadvantage; there will be obstacles in the lines of communication. On the other hand, if the previous chapters have been read attentively (especially if the illustrations have been played through carefully), the reader already knows enough of music's anatomy to be able to watch that structure come to life and begin to function. There is much that he is bound to miss—with his ears even more than with his eyes—but there is much also that he is bound to capture, and to profit by.

For not only do the principles of counterpoint yield amiably to capture, at the hands of any per-

son not too terrified by tradition to pursue them; they yield profits of the first musical order. And this second point calls for as much emphasis as the first one, since the benefits to be derived from musical theory in general, and from counterpoint in particular, are widely misunderstood by the musical public. It is the composer chiefly, and even the composer exclusively, who is supposed to profit by such studies; their value to the auditor is thought negligible. Perhaps there are greater fallacies extant than this one; if so, one needs industry in order to find them. The simple fact is that every music-lover can and should study musical theory; he can, because the study is no taxing one; he should, because there is no real substitute, though there are several makeshifts, for this guide to all musical experiences.

But what are the principles underlying counterpoint? the reader will begin to ask in impatience. How does a tonal structure learn to function? Wherein lies the promised secret of activity? By what method does our harmonic body become music?

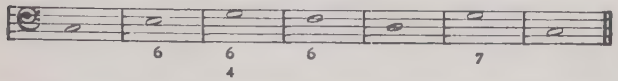
Well, there is a broad answer to such questions, and there is a narrower answer. The broad answer, as already indicated, is polyphony. The narrower answer is the title of this chapter. That is to say, polyphony, or the independent activity of our four voices, is a general term covering various kinds of motion. Counterpoint, on the other hand, embraces only certain of these varieties of motion. What these varieties are,

how they are secured, wherein they lend life to our musical torso, and how we reduce them to rhyme and to reason—this is what we must now see, for we have reached counterpoint, the second great department of musical theory.

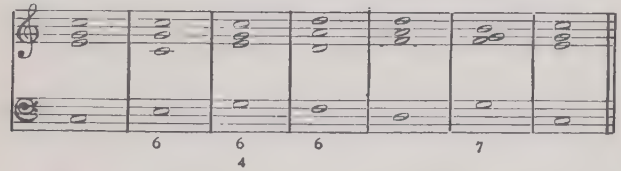
In a former chapter we compared time with the life-blood of our musical organism. It is hence time which begins to course through the tonal arteries, nourishing the tissues, warming and vitalizing the whole body. And it is this stream of life which counterpoint measures, charts, studies. But there are other things besides time which it studies. Consequently, before we get any satisfying glimpse of a tonal heartbeat, we pause on the threshold of that experience. First of all we must see what is the basic method for ensuring independence of our separate voices.

Stated as briefly as possible, the basic method is to force each one of the four voices in turn to participate in some given type of motion. Instead of allowing the soprano, for instance, to put on airs at the expense of its companions—literally to have whatever airs may be going—we persuade the other voices to borrow this melodic finery. Or, since we commonly start with the lowest voice, whatever the bass does must be done in turn by the other voices. In this manner, as it will be obvious, we force equal honours and responsibilities upon *all* our four voices without prejudice; and, in doing so, we at once lay the ground for vitality in every fibre of our organism.

For example, the following is a typical bass set the harmony student, who, in accordance with the harmonies indicated by the figuring, adjusts his three upper voices, moving them to the prescribed elements of each harmony in deference to certain rules of motion, several of which were given in an earlier chapter:



And from this bass there hence rises the following structure:

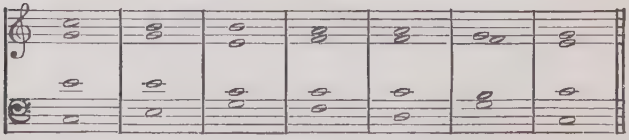


But there are two ways of regarding this bass. One, the anatomical way, is to regard it as an integral part of a specific harmonic structure which is indicated by the figuring beneath it; and this is the way the harmony student regards it. But the second way is equally important; and this second way the student of counterpoint in turn regards it. For the harmonic structure no longer is a mere prescription; henceforth it is to be the outgrowth of the demands of the separate voices. Consequently, figures indicating our tonal anatomy are dropped when we come to counterpoint, save for the purpose of indicating, *after the harmonic structure has arisen*, the precise

shape which the harmonies *have* taken. In other words, the foregoing bass could be retained for an exercise in counterpoint, but it would not then be regarded as the bass exclusively; instead it would be called a *canto fermo*, which, though first given to the bass, in turn would be given to the other voices.

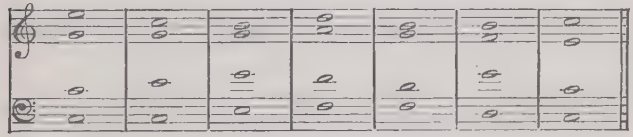
Let us, then, take this same bass over again, calling it now a *canto fermo* (literally a "firm song") and watching the specified motion of this *canto fermo* in the act of being caught up successively by all four voices. Since the successive harmonies are no longer established, they may, *or they may not*, be the same as the ones we have just listened to. Consequently, starting with the *canto fermo* in the bass, the foregoing harmonic structure *may* be identical with the one given, thus:

But it also, as we have just said, may be different, so that the same *canto fermo* placed a *second* time in the bass gives us a somewhat different harmonic body, thus:

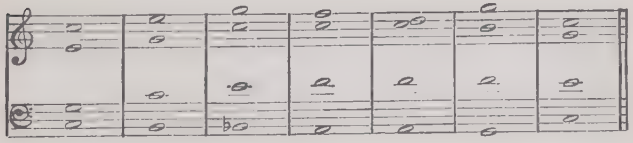


And the same principle holds true when, in turn, we come to the tenor, to the alto, and to the soprano. When we give the *canto fermo* to the tenor, for instance, the following harmonic structure may develop:

Or, should we prefer, we may have the following:



And once more, this time giving the *canto fermo* to the soprano, the following harmonic structures are equally possible:



Here, very briefly, but I hope not inadequately, the reader has been brought face to face with the central principle behind the physiology of music. And here the student of counterpoint tarries till he can construct such exercises as these fluently—not only writing them, of course, but hearing them *while* he writes them, and again following the path of the voices that weave themselves about the *canto fermo* when each little organism is made audible.

That a small measure of life has already crept into our harmonic structures is apparent. If the reader will take the trouble to play through the foregoing illustrations he will notice two points which are important: first, every one of the harmonies is a familiar one, so our anatomical laws are not abated; secondly, a curious shudder of vitality has passed through those simple and familiar structures. Most emphatically, our organism is beginning to function; life is plainly entering it, even if slowly.

But if there is a shudder of life in these organisms, so far the vital spark is a feeble one. What we must do, therefore, is to fan it. What we must do, in terms of physiology, is to stimulate the circulation and respiration. The life-blood of music—time—must be made to course in a quickening stream through every artery.

To attempt to sketch one-half of a small fraction of the multifarious varieties of a musical pulse-beat—this would be absurd, because impossible. Yet

if they are innumerable, varying as much as the pulses of actual living creatures, and further fluctuating (as they do elsewhere) in each organism, two broad types include all varieties. One is a double rhythm, one a triple. All music has the one pulse or the other.

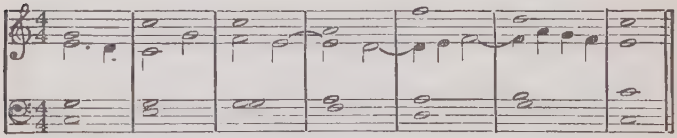
An incidental curiosity in the evolutionary history of music was the belief, stoutly held by mediæval musicians, that triple time was perfect, double imperfect. The theological reason for this bizarre opinion was that the number three, reflecting the Holy Trinity, was a perfect number; any other number was consequently a corrupt one. We have since taken arithmetic into our own hands, and apparently have not angered heaven in so doing. In any case, double time is now perfectly respectable at least, if not perfect. Indeed, as if to even up matters, the greater portion of the world's music is in this rhythm. Nevertheless, these two fundamental pulses both are at the bottom of all music (with perhaps half a dozen well-known exceptions); and though they are frequently mixed, as they are in 6–8 time which is composed of two pairs of triplets, one or the other rhythm in every case triumphs.

We have, then, two rhythms which are fundamental—the basic pace of the throb of each organism. At the same time there are many other smaller rhythms, or at least divisions of the former, which are picked up by the various voices, then dropped for an instant, and then picked up again to be modified.

It is of these smaller beats that we say we cannot count them. And because we cannot count them we cannot, in any finished manner, catalogue them. They elude detailed description as certainly as inflections of the voice, little gestures of hand and eye, elude every attempt at enumeration. For when we are in the presence of life, statistics are foredoomed to failure.

But—and this should encourage us—we *can* reduce activity to general principles. And we manage to espy a cosmos in an apparent chaos by the simple method of starting off very simply.

Let us start off in some such manner as the following:



Here the *canto fermo* is in the bass again, and, as before, it proceeds on its way with only the barest suggestion of any rhythm. And yet something definite has happened to it. The actual progression of tones is the same as before, the harmonic structure of which it is an element stands unaltered, but *vitality has crept both into that single voice and into the entire harmony*. Our organism has perceptibly been quickened. It is coming rapidly to life, not simply because a single one of the voices has been accelerated, but

because there is *contrast* between the activity of its members. If the more rapid voice lends vitality to its companions, so too does the slower motion of those companions return the compliment, heightening the colour of the voice which moved faster (in this case, the alto).

And if we pursue this process, we find that life becomes progressively conspicuous. For here we discover increased vigour:

And in the following illustration, whilst we stand before no organism of a noble order, still we do stand before an organism that unanswerably shows it has learned a living secret:

In the very limited space given ourselves we have naturally been unable to push our scrutiny into the heart of actual music. The *canto fermo* selected for the illustrations was far from eloquent; the counterpoint developing out of it was not remarkable. A gap still remains, consequently, between the great compositions with which the reader is familiar and the little organism inspected in our laboratory. The magical properties of true music are lamentably missing. And, as it has already been said, they are bound to be. There is but one way of catching hold of the innermost secrets of music—which is to seize on the very compositions containing them.

But one specific and important thing we have accomplished, while examining the physiology of music; and that is nothing less than discovering the fundamental method by which a harmonic structure achieves its vitality. To comprehend this method is to grasp counterpoint.

In the next chapter we shall observe how the principle of polyphony extends its power in those special fields called fugue and canon. And in the chapter following we shall gather all our discoveries together, applying them to actual compositions. In this way, it is to be hoped, the reader will begin to discern how every one of the principles we have scanned finally coalesces in miraculous focus.

The reader will do well to remind himself, nevertheless, that what does come to a focus in music—

whether it be exalted music or humble—is not anything additional to those anatomical and physiological laws which, in however abbreviated a style, this work offers him. Whilst the principles in themselves are not music, or even the guarantee of music, whatever music there is was created through them. And from them, as from a matrix which never wearies, never loses that form which it lends perpetually, more music will be poured forth in the future. Anatomical laws are not enough, physiological laws are not enough, to engender any art that is truly living. But as nearly as anyone can reach down into the very heart of living beings, one is able to do so to music by probing the few principles now set before us.

CHAPTER X

FUGUE AND CANON

The English word "fugue" is derived from the Latin verb *fugere*, to flee; and the English word "canon" is derived from the Greek noun κανών (kanon), rule, in turn derived from κάνη (kane), a reed, which was used as a rule or measuring instrument. The etymology of these two words is not important; it is set down merely in the hope of starting a new train of associations in the reader's mind. For, by and large, both words are simply synonyms of the one word "boredom."

It was the Spanish-English philosopher Santayana who, in a somewhat acidulous moment, described the average reactions of the average listener to music. What that average listener experienced was, according to Santayana, a pleasant state of somnolence relieved by nervous thrills. That was what he commonly experienced, and that was in any case what he demanded. If music did not lull him to sleep, waking him up just often enough to make the appreciation of his delicious state of unconsciousness possible, then what he was listening to was not music. It was noth-

ing but complicated and expensive boredom. Often, no doubt, it was fugue and canon.

As has already been indicated—the hint will be developed in our next chapter—a great deal of the greatest of the world's music is a mixture of homophony and polyphony. Nearly everything Beethoven wrote is, on the one hand, a tribute to four voices as a community and, on the other, a triumph of four independent individuals. Brahms and Wagner carried on this tradition, which had been passed down to them (though somewhat modified meanwhile) by Schubert and Schumann. In fine, the nearly uncompromising polyphony of such masters as Bach and Handel, Mozart and Haydn, has, since their day passed, given way to a deliberate mingling of the two methods. Nor can one gainsay the advantages which have flowed from it. The art of music has been enriched immeasurably by such treatment. To cry for the days of perpetual counterpoint would be as foolish as to wish that blank verse were the exclusive medium of every playwright. Nevertheless, if we no longer remain content with former customs, we can ill afford to overlook the role polyphony does perpetually play in all great music. And we most certainly impoverish our musical natures, to say nothing of decimating our musical libraries, if we make no room in our minds, and on our shelves, for creations which are exclusively polyphonic.

The chief complaint against the fugue is that it

is—to state the matter lightly—incurably and intolerably tiresome. It gives us no nervous thrills, and it also fails to induce delicious slumber. The voices may flee from one another—but the auditor, without creating a disturbance, cannot flee likewise. And dull resentment in his breast is the consequence. Is it not a real hardship to be in the presence of so much flight, and yet to remain utterly stationary?

It certainly is. And it is hardly to be wondered that a fugue is as unpopular as we find it. For until an auditor *does* take part in the flight of those hurrying voices, he never *will* be really happy—and he never should be.

There are several reasons for the unpopularity of counterpoint, just as there is more than one reason for the unpopularity of fugues and canons. And one of these reasons is that a contrapuntal composition can be—and sometimes is—precisely as dull and empty as a composition of another nature. But a much commoner reason lies in the auditor himself who, unconsciously shamed by the tremendous activity confronting him, saves his face by sulking in a corner. The little exertion he might be tempted to expend would, as he realizes, make a paltry showing in the presence of such vigour.

It is, then, the auditor's failure to participate in the life of such musical organisms that accounts for the apathy that they elicit. And the problem hence becomes one of cajoling the reluctant listener (or,

as in the present case, of assisting the willing listener) to identify himself with the separate figures in a drama—a drama which has bored him in the one case, in the other baffled him.

The first step toward the appreciation of a fugue or a canon—that is, genuine appreciation, and not the mind's nod of respect for clever workmanship—is familiarity with the principles of counterpoint, and familiarity that has been acquired by actual practice. The reader may not care to go to the trouble of studying counterpoint, which presupposes the study of harmony. This first step, therefore, may prove unpopular at the outset—which is unfortunate. The best that can be done here, consequently, is to urge contrapuntal discipline in all earnestness, but to concede, as we do concede, that actual contrapuntal study is not indispensable, even though some knowledge of polyphonic principles may be named so.

The next step is a clear understanding of the nature of these two species of polyphony.

And the third and final step—one which we shall take time only to sketch roughly—is a detailed examination of actual fugues and actual canons. Here matters are frankly up to the reader. If he really wishes to dig into them deeply, he will find nothing to halt him but mortality. In any case, what might be termed an absolute minimum of analysis is comprised within two types of exertion: (1) familiarity, based on *repeated* performances, with three

or four examples of both these varieties of imitation; (2) that kind of intimate and personal knowledge which comes only through repeating, note by note on music paper, each smallest action of each one of the voices. In other words, the reader is urged to take an actual fugue and an actual canon* and, laying them before him, copy out, note by note, compositions with which he *supposed* himself familiar. What one learns by such tactics falls only a trifle short of pure revelation.

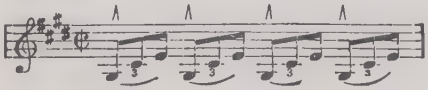
Returning now to the second step, we come to definitions of fugue and canon. Definitions here are valuable, not only in keeping separate these two major forms of imitation, but also in crystallizing the precise purpose of each one of them, to say nothing of summing up their joint purpose.

Fugue. A fugue may be defined (and is defined by Webster) as follows: "A polyphonic composition, developed from a given theme, or themes, according to strict contrapuntal rules." And this is good enough as far as it goes. It hardly goes far enough, however, and it fails to go in a sufficient number of directions. Let us amplify the definition in several manners.

The first amplification we need is a statement regarding the *number* of fugal voices. Must they always be four? The answer is no. For, whilst it is per-

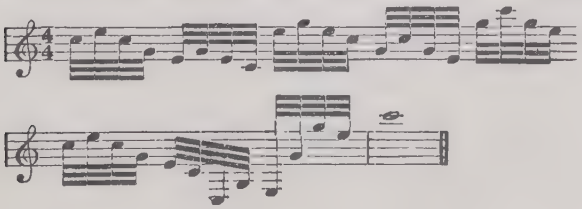
* For fugues, the reader is directed to *The Well-Tempered Clavichord* of Bach; for canons, to several of the same composer's Goldberg Variations. Several of the fugues have been recorded.

fectly true that a quartet is the basis of anatomy, it is not perfectly true that four voices at all times must be sounding. The activity of a smaller number of voices may give the impression of a larger number remaining stationary. For example, the first four measures of Beethoven's "Moonlight" Sonata are composed of only three voices, but the upper voice, being in action, supplies what otherwise would be a deficiency. Those successive tones which it sings:

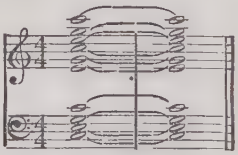


become, in the auditor's memory, the following:

Well, this is precisely what we observe in a great deal of music which, at any given instant, would seem to be harmonically defective. And it is what we observe in many fugues also. For it is possible for even a single voice to suggest, by means of its motion, the three missing companions we continually look for. Indeed, if the voice moves very rapidly,



many more than three voices may be suggested. Thus the preceding motion of only a single voice gives us the harmonic effect of the following:



There is, of course, an important difference; otherwise we should never use the former passage instead of the latter. The difference is so exceedingly important, in fact, as to set forth, in a flash, the whole difference between the static and the dynamic. For it is equivalent to the difference between a solid wheel at rest and a spoked wheel rotating with great velocity. But if, on the one hand, we must recognize the tremendous vigour secured by such treatment, we must also recognize, on the other hand, the mere structural or harmonic consequence of our experiment. *In fine, a single voice in motion can give the basic harmonic effect of several voices.*

Now, a fugue obviously cannot be created by a single voice; for a fugue is a composition in which a theme (called the subject) is given out by one voice and is then repeated by another voice while the first voice (having done its duty) continues merely to elaborate contrapuntal effects freely, either above or below the second voice which has started singing. And when the second voice has finished, this does

likewise. But if more than one voice is hence necessary, more than two voices are *not* necessary, and for the reason given in the paragraph preceding. The answer to our first question is therefore simple. And some exceedingly fine fugues may be found to have no more than two voices. A familiar and unusually worthy one is the E minor fugue in the first book of Bach's *Well-Tempered Clavichord*. It opens as follows:

As illustrating the point we have been making, this and other two-voice fugues should be examined, memorized, and copied. Harmonic fullness is obviously and inevitably sacrificed—since two voices are not four voices and never will be. But the *structure* of four voices is continually suggested (for example, the first four *successive* tones suggest the *chord* E-G-B-E very plainly); and that is the significant fact which we are stressing. Deliberately limiting ourselves

to two voices, yet we find music's anatomy standing before us. It is an etherealized body, but a far more persistent one than any ghost that haunts graveyards.

A second point regarding fugues may well be amplified. For a fugue, as it has been said above, is one of the two major species of imitation—the second kind being canon, which we are coming to. And the reader may wonder how imitation can come in varieties. Either you imitate a thing or you do not imitate a thing, it would seem; if musicians were logical they would surely know this.

The objection would be well taken were there grounds for it. As a matter of truth, there are no grounds whatsoever. For, as we have just seen, the *subject* of a fugue *is* imitated by each voice as it enters *seriatim;* on the other hand, though each voice will return again and again to the subject, it occupies itself meanwhile with other matters. But these other matters are emphatically not random matters. For, as much as possible, the waiting voice occupies itself pertinently, bantering with the subject or conversing gravely. At one time it will stand the subject on its head for a moment:

At another time, by the process called *augmentation,*

it will invest a rapid subject with dignity, turning eighth-notes deliberately into quarter-notes:

And again, by the converse process called *diminution,* it will extract merriment from a ponderous subject by turning quarter-notes or half-notes into eighth-notes:

There is, therefore, a great deal of freedom in fugal writing, even though the licence that is permitted must be purchased. And a third point to be developed in the definition of fugues is just this fact that liberty is still possible. A fugue, in short, is no endless one-two-three grind. It is a form of composition that limits itself deliberately and undeniably. But if there *is* that limitation imposed upon it, freedom *within* those limits is continually possible. And not the smallest marvel of a masterly fugue is precisely that liberty which any one of the voices may take with the subject while developing the latent powers *of* that subject. Not to realize this is to train

our ears on nothing more than a subject which keeps appearing monotonously.

But to say something compactly is one thing; to say something without wasting an ounce of breath or a single syllable is plainly another as well as a more difficult thing. To write a terse essay on love is an achievement; to write a Shaksperian sonnet is a triumph. And we hence come at last to that most taxing, that most austere, form of composition which man's passion for economy has developed.

Canon. It is difficult to express one's admiration of a canon without violating the very principle it is founded on. For here all exuberance is chastened, here the adventitious is pure impertinence, here the least discursiveness would be garrulity, and the smallest whisper of liberty, revolution.

To phrase the situation thus is to repel the average music-lover on the instant. Arctic frigidity seems to congeal our imagination; our mind is frozen by the prospect stretched before us. Rules as rigid as iron and as cold and hard as a glacier are objects craving our interest and our homage. How can anyone, with a spark of music in him, consider a canon at all, much less admire it at all, and still less place it on a pinnacle to be venerated?

Some such question is almost certain to arise in the reader's mind when first the nature of a canon is laid before him. Nor is it likely that these few words will disperse it. Without acquaintance with

counterpoint, and without that deepening love of it which grows apace with widening acquaintance, the austerity of a canon will prove offensive. It offends the music-lover because it seems to desecrate the very spirit of music. Where he looks for freedom he sees oppression; where he listens for untrammelled beauty he hears his goddess making moan at a prison window. The soul of music has been shackled and its body manacled. No longer is there even that limited freedom which was enjoyed within the fugue, and enjoined by it. For freedom in music has departed utterly. The icy hand of iron law has become omnipotent—and it is canon which men name this ruthless jailer. For a canon is well named: it is rule personified. Those voices which heed its command are chained to a destiny, dragged along to a doom, implacably. The joyous dance of the creative mind has become a lockstep.

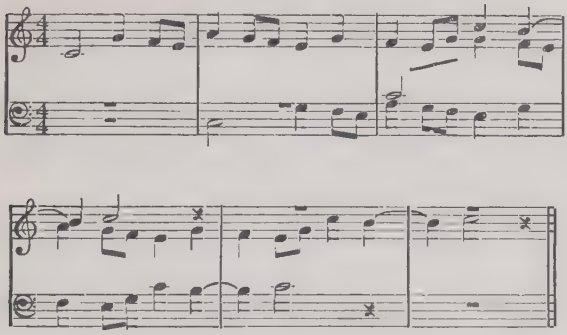
And this view, fundamentally absurd though it proves to be, does appear less than ridiculous on the surface. For if one voice fails to imitate another voice exactly, and throughout the length of its entire career, the existence of the canon is forthwith ended. It ends just when liberty is allowed to enter. One voice, announcing some given phrase, is imitated by another voice which announces exactly the same phrase while the first voice continues on its journey; this second step of its journey is similarly duplicated by the other voice while the first voice goes on to

its third step. And so, to the end of the canon, this rigid process of imitation is continued. In consequence, a canon may be defined as a single extended phrase duplicated precisely by one or more voices in serial fashion. Were they to enter simultaneously, we clearly should not have a canon; we should have merely a unison performance, or a performance in octaves, or (where the phrase is repeated at some other interval) a weird species of harmonic progression. It is because the voices do *not* enter simultaneously that the original extended phrase yields its riches. For example, consider the following simple phrase:

If we give this to three voices simultaneously, we have nothing more remarkable than the following:

But if we now take this same phrase, not altering it by a jot or tittle, and give it to three voices in succession, letting each voice merely overlap its companions, something unique instantly happens. What happens, in brief, is a canon. It is not a remarkable canon, assuredly; but its very simplicity helps to make

clearer the remarkable principle behind all canons. For we have the following:



And what this simple illustration brings to the surface, rebuking all our dismay over lost freedom, is the very same principle, but now carried out to its uttermost limits, which we found earlier to be the base of tonal eloquence—namely, the limitation of our tonal material. Not more surely did music begin to achieve the power of speech when men's wails were reduced to a few elements; not more surely did the well-tempered scale further a pregnant process already started; not more surely has any apparent constriction of freedom set at liberty the powers of the musician than this crystallization of all those processes in this thing called canon.

For the principle of the canon is, beyond any question, the cap-stone and the shining pinnacle of music. It is, in terms of anatomy and physiology, the

habitation of the mind where the eye is seated—and where the ear, silent as a corridor, transmutes while it transmits motion, and makes that music. It is the intellect of our musical organism, where, at last, all passions have their abiding home, since none may do hurt to any other. For now, within a single voice, any voice, its own harmonic destiny is established, and the structure and functions of its companions lie latent.

It is natural that, having attained this loftiest pinnacle of music, we need time to become accustomed to so great an altitude. The ascent which we have made has been a rapid one; the air that we breathe is highly rarefied; even the temperature at first seems very chilly. But here, on the haughty peaks of the musical world, is to be discovered an intoxication of the spirit transcending any delight we yet have tasted. And it is in the realm of canon, therefore, once the stage of giddiness has passed, that we would tarry longest in calm but exultant fancy.

As we know, all life is not lived out in an ivory tower. There are many other and proper interests besides thinking. The musical organism, no less than the human, craves diversity. But it craves the incorruptible serenities of thought no less than the flaming adventures of the day that is passing—and it will never be satisfied if not given them. It delights, like man himself, in pure symmetry. And, like man him-

self, if it but chooses to, it can, whensoever it will, elect that destiny:

Reversible Canon for Two Voices

W. P.

W. P.

Reversible Canon for Two Voices

CHAPTER XI

THE ANATOMY AND PHYSIOLOGY OF COMPOSITIONS

The structure and functions of musical organisms have been examined in the order named, and separately. It is now time, prior to reaching some more general views on musical forms in our next chapter, to co-ordinate these two principles, observing their direct application to actual music.

Doing this is important for two reasons. It will assist us in realizing that the anatomical and physiological laws of music are no mere academic discoveries, remote from the compositions we are familiar with. It will also aid us in getting a still clearer idea of the interdependence, as well as of the independence, of two large principles. Anatomy *can* be divorced from physiology, for purposes of study; and in many compositions the separation is evident. The maximum amount of separation is reached in compositions which are largely (if not entirely) chordal. In the chorale, for example, a simple air (usually given to the upper voice) is supported by the three other voices which elaborate the underlying har-

monic structure. These three other voices are at once subservient to the melodic voice and to each other. Here, consequently, homophony triumphs. And at the far end of the scale, as we observed in our study of the fugue and canon, polyphony is conspicuously in the ascendant.

But if there is life both at the poles and at the equator, the temperate zones are more favourable to it than either the arctic or the tropic regions. In the latter, the lush prodigality of living things is carried to the point of being stifling; in the former, the rigours of the climate strip the scene of all but the hardiest creatures. What we want in general, therefore, is a happy mixture of these two different climates. Warmth we demand, but not torridity: the keen winds of the north must enliven it. Cold we demand, but not frigidity: the breath of the sirocco must make it bearable. As we know, there are times when the one climate or the other offers the very temperature suited to a special purpose. But these have already been studied. We therefore now come to that great temperate zone of the musical world where the lushness of harmony and the bleakness of polyphony are married. We come, in fine, to the great majority of our greatest tonal organisms. For most of them are born of that union.

There are many faults in contemporary music; but undoubtedly the most conspicuous of them all is that ephemeral quality which is best described as ef-

feminacy and which is due, in notable degree, to the failure of a harmonic structure to function. The musical body is flaccid for want of exercise. "Music, in parts, still nominally remains," as William Pole in his *Philosophy of Music* has phrased the malady; "and indeed, in instrumental music, we have more parts in a score than ever were known before; but it is astonishing how little real counterpoint there is in the majority of modern compositions, the parts usually filling in the harmonies with little or no individuality of their own."

And a similar view was advanced by Moritz Hauptmann. "The ancient [i. e., former] polyphonic music was a combination of melodies," Hauptmann wrote, "which were so contrived as to go together. The modern is merely successions of chords divided among several parts. And although the old music was often defective in the harmony, the new is more so by the repulsive and unnatural motion of the parts; so that, judged from the proper point of view of part-writing, much of the modern music is more barbarous than the first contrapuntal attempts. . . . I have nothing to say against all this, but would rather have nothing to do with it."

It is no part of the purpose of the present work to inveigh against current evils, which, it may be hoped, are only temporary. But it is necessary to mention them, not only as a matter of passing record, but also as a preparation for the triumphant fusion

of two broad principles in the few representative passages to be cited. The compositions we shall look at are, by general agreement, genuine music. The reader will therefore do well to consider how much of their vitality and richness is due to the fact that "the greatest of all musicians have succeeded in satisfying both conditions"—the demand for homophony, on the one hand, and the demand for polyphony, on the other.

In the ensuing chapter on musical forms we shall see that no single part of a composition can be isolated and judged fairly on its own merits. We need to examine the entire career of any musical organism before deciding that this particular day or that particular hour out of its whole life merits our esteem, our indifference, or our disapproval. Perennially important as this attitude is, when we bend our mind over any composition in order to examine it, it is signally important during the work lying ahead of us. For, of necessity, only excerpts will be given.

For example, what are we to say of the opening of Beethoven's Hammerklavier Sonata?

That great leap of the bass is vigorous, certainly. In full knowledge of the whole sonata we may call it a magnificent gesture, as bold and brave as the shaking of a titan's fist. But in itself is it to be named magnificent—or, indeed, anything? To say so is to land ourselves in musical folly. For, let that great leap of the bass be continued awhile and the magnificence we thought was there turns to banality. The shout of a giant becomes the apoplectic seizure of a moron. What we thought was inherent in a very brief passage, in fine, proves to be inherent in it only because certain known passages *are* expected, or, in any case, because certain other passages are *not* expected. For if we were to continue thus:

the whole passage becomes painfully futile; the original phrase, which in its proper associations

is magnificent, is shorn of nine-tenths of its power.

Association is so strong that banishing it altogether may be impossible. But the foregoing illustration nevertheless gives a hint of the continual force of the principle mentioned—to wit, that the so-called native magnificence of any musical phrase, whether long or short, rests largely in distant parts of a composition. When it is said, therefore, that homophony and polyphony are mingled in a great deal of the greatest music, the reader must not expect harmonic treatment to predominate in one measure, contrapuntal treatment in the measure succeeding it. No such childish mixture of our two principles will make us music. We must look rather to a broader scale of values, to a larger standard of proportion, such as we find manifesting itself, again and again and yet again, in all the truly great music which we shall quote from.

As our first illustration of this point, let us consider this very sonata a little further. The opening measures, given above, are largely if not entirely homophonic: the individuality of the voices is clearly submerged in the interests of the community; the treatment is obviously chordal. What thereupon happens? For twelve full measures contrapuntal treatment is conspicuously in the ascendant, to give way in turn to ten full measures of treatment that is again homophonic. And if we follow this clue through to the end of this first movement of this same sonata,

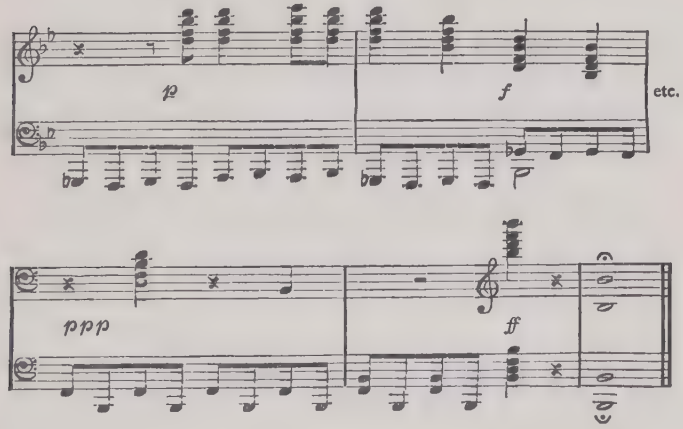
we shall discover that the alternation continues. Now we are confronted by homophony:

Now by polyphony:

Now by a mingling of the two principles:

and again in:

until, coming to the concluding measures of the movement, we find the whole movement dynamically summarized and thematically echoed in the following:



And what is true of this first movement of the Hammerklavier Sonata is true, *mutatis mutandis*, of the succeeding movements. The *Scherzo:*

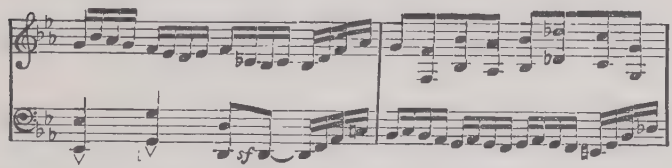
and in turn the *Adagio:*

are, as movements, more continually homophonic in treatment. And if we should pause here, the sonata as a whole would be ill balanced. But Beethoven does not pause here. And because polyphony again comes dramatically to the fore in an elaborate *finale* in the fugal manner, the whole work is a flaming fusion of our two principles.

Brilliantly as this particular sonata shows forth the doctrine which we are studying very briefly, other sonatas might have been cited as appositely. And so might a multitude of string quartets, choral compositions, and symphonies—not from the hand of Beethoven alone, of course, but from the hand of any composer who is a master. It is difficult, in fact, to make selections, since we are embarrassed by a wealth of illustration. We seem to be biased in our choice, whereas we actually are taking illustrations at random.

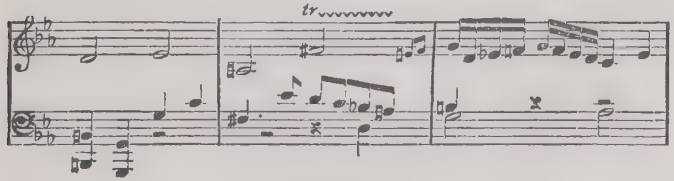
Does the last of Beethoven's sonatas open thus in a plainly homophonic manner?

Then, as certainly, we are in the thick of polyphonic activity a little later:



And as surely as our voices come together again in a homophonic section:

it is but a little while before they have yet once more broken loose in polyphony:



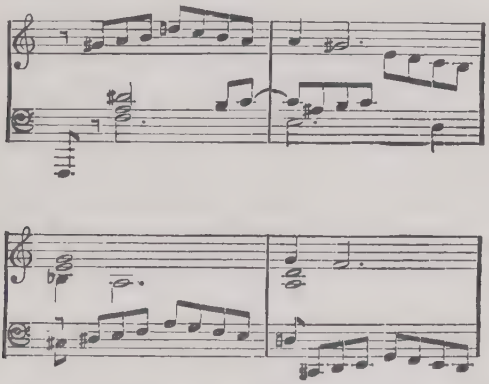
Or let us consider choral music. Does Handel open the "Hallelujah Chorus" in his *Messiah* with four voices welded together in a single passion?

Yes, he does so unmistakably. But as incontestably as these voices were joined, they proceed to separate; for the Lord God Apollo loveth each one of his children:

For the Lord God om-ni - po - tent
Hal - le - lu - jah, Hal - le - lu - jah Hal-le -
Hal - le - lu - jah, Hal -
reign - eth, Hal - le
lu-jah Hal-le - lu - jah, Ha - le - lu - jah
etc.
le - lu - jah
Hal-le-lu - jah

Does Schumann, in his A-minor Pianoforte Concerto, tell us that the demands of homophony must be satisfied? He does:

But no less emphatically does he tell us, romanticist though he is, that polyphony is not a mere classical device; for he tells us, as every composer of genuine worth is repeatedly telling us, that this other principle is an integral part of all true music:



Scant that principle we may; renounce it we also may, if we care to do so. But if we do scant or renounce it we pay the consequences. For, like any living organism, our tonal body requires exercise and, failing to get it, becomes emasculate.

And should we ever doubt the persistent truth of such a statement, we have only one thing to do in

order to convince ourselves. We have only to examine compositions which we do feel are ephemeral, effeminate, flabby; whereupon the truth leaps upon us savagely and remorselessly. *Our tonal structure* must *function or it is a dead body.*

It is not necessary, needless to say, that our tonal structure function in the precise ways that have been indicated in this chapter. Only a corner of the whole truth has been chipped off to serve the purpose of condensed illustration. Some compositions are more deliberately and continually polyphonic than others and yet are not to that degree greater music. For mere polyphony does not guarantee inspiration. Conversely, homophony must not be thought of as a handicap which gnaws at the vitality of music. If, on the one hand, we recognize the importance of polyphony, according it the highest possible rank in fugue and canon, we must not do less for homophony, which, on the other hand, not only is the actual structure of all musical organisms, but also (in special cases and for particular purposes) has the unique honour of standing alone in such compositions as the chorale. In short, unless we are to exclude the majority of the world's great songs (which represent homophonic compositions), we are bound to admit that the individuality of merely *one* voice is sufficient at times to ensure the vigour of the harmonic framework. And this we do admit without quibbling.

But it is nevertheless true that *all* the voices

must function in structures of any considerable magnitude; otherwise the tonal body is but half alive and, being hence half dead, bears within itself the seeds of dissolution. Such compositions may hang on to life; they do not embrace it; and if they eke out an existence it is the pitiful one of chronic invalids, who, simply by failing to walk, have lost the power to.

What we therefore expect to find in the enduring handiwork of a musical creator is what we do find abundantly and without exception.

We find, in the first place, a tonal structure. We find a structure of remarkable simplicity, not only with respect to the scale which it grows around, but also with respect to the number of the tonal members which compose it. For we find four limbs, and four limbs only; and how these are affixed to a torso, how they achieve the power of articulation, and how the whole form covers itself with flesh and muscle we have learned in our earlier chapters.

In the second place, we find a second principle which corresponds far from badly with physiology—with the power of our own bodies to function. And how these various activities of our tonal organism correspond in turn with biological actions we also have seen.

But now we find what we may call a third principle—which is the marriage of the two principles just mentioned. For we find, when we examine the

great majority of our greatest tonal organisms, that these two principles are persistently mingled. Just as a man must rest now and again from his labours, so do these tonal organisms intermittently become content with being structures—with doing no more than breathe for a season. But anon, recuperated, they awake again. And what they do then we have seen also. Stretching their limbs, invigorated by repose and eager to make use of their stored-up power, they take up the several tasks lying before them.

These anatomical and physiological figures are, if the reader will have them so, forced analogies; but the writer cannot agree if the common meaning of that phrase is the one intended. For such analogies are forced only in the sense that they force themselves upon the student of music. They have forced themselves, in any event, upon the writer after twenty years' study of the art of music; and it is not impossible that other people will also be willing to appear just a trifle ridiculous if important truths can be purchased at so small a sacrifice.

Insisting that musical compositions are living creatures, like unto ourselves in point of structure, like unto ourselves in point of function, and, finally, like unto ourselves in the balance between two basic principles—this in itself is not important. One may hold that the anatomy and physiology of music are pure metaphors, and still keep a great truth

within ear-shot. The truly important fact—and from this fact no escape is possible—is that every healthy musical composition *is* built up, cell by cell, of simple elements; that it *does* grow in a simple and orderly manner; and that the secrets of each one are most surely disclosed by studying that one world of tone which they all inhabit.

We shall presently see in conclusion that each composition is unique in some particulars; for every organism does boast its own identity. As no two creatures are precisely alike, even as no two crystals are precisely alike, so no two compositions conform exactly in every detail. And it is exceedingly important to remember this. It is exceedingly important, when we turn to the forms of music, not to be blinded to the truth of diversity. We incurably cramp our vision if, for purposes of cataloguing, we pretend that each man, in belonging to the class mammalia, is a mammal only.

But unity there still is, if there *is* variety; and we shall not fail to see it whenever we direct our gaze toward any of those compositions which thrive in the great temperate zone of the world of music. For we find our two principles mingled, in humble compositions as well as in exalted ones. We find that third principle in the works of Bach, of Beethoven, of Brahms, of Handel, of Mozart, of Haydn. We find it even in so purely a romantic composer as

Chopin who is not afraid to touch his lyric A♭ *Ballade* with double counterpoint:

And even in a modest hymn tune we may find it:

For if the frame of our musical creatures is homophony, their life is polyphony, action.

CHAPTER XII

MUSICAL FORMS

Architecture has been described as frozen music. The comparison, like many comparisons, is none too happy. On the one hand it lends too frigid and rigid an air to the harmony of spatial proportions; on the other hand it confers too volatile a character on those temporal shapes in which tones have their being. It is admittedly more difficult to conceive of form as duration than as extension; for shape always suggests space and commonly requires it. Nearly every one of the words which we use to delineate the qualities of a building—solidity, height, breadth, amplitude, and so on—are words dyed indelibly with spatial attributes. Indeed, if space is what we live in, space is also what we perpetually think in. Cheese may be high without requiring space or remotely suggesting it; a man's thoughts likewise may be lofty in a spaceless manner. But the words we use to suggest the greater number of the qualities of the universe are—turn and twist them how we will—words which space has claimed for its own vocabulary. We borrow them because we can, but we must return them.

It is extremely difficult, therefore, to divest a purely temporal art like music of those spatial characteristics laid upon it by common language. Our speech chronically falsifies each endeavour. If a composition is not "great," it is "magnificent"—and magnitude has us again in its clutches. But if we do, ever so slightly, succeed at times in keeping space out of music, we accomplish this task to our irreparable loss if we rob the art, in our thoughts, of a firm structure —a structure as definite in its outlines, as explicit in its proportions, as any granite edifice rising lyrically toward the heavens.

The main forms which music takes are quickly listed, being no more than two in number. One is a cottage, one a cathedral; one is a song, one a symphony. So at least, in academic haste, we might group them. With equal brevity, no more but no less misleading, all the buildings standing on four continents could be pigeon-holed. Unfortunately, this simple division profits us little or nothing: it neither sharpens our perception of inner unity nor reveals the immense variety nourished by it.

One symphony is like another in many details—or, rather, one symphony is like another apart from details; but more must be said or we say nothing. César Franck wrote a symphony in D minor; so did Beethoven. If tonality is fundamentally important, some strong resemblance might be looked for ex-

pectantly. Look (or, rather, listen) for it till your ears ache!

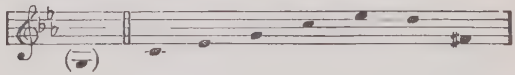
Is time, then, perhaps more important than tonality? If you say it is, you are welcome to the consequences in their full absurdity. Take the first movement of Brahms's C-minor Symphony, the last movement of Schumann's Pianoforte Concerto, Bach's great A-minor Fugue for the organ, and Mendelssohn's notorious "Hunting-song"; all are founded on 6-8 rhythm and all have less resemblance even than human faces.

Then, it may be asked, does not the minor mode perhaps constitute some criterion? As opposed to the major mode, may it not possibly serve as a bond of resemblance? Yes, in very sooth, it will do so on those occasions when it does so. There *is* some similarity, for example, between the two greatest funeral marches in existence: Siegfried's by the titan of Beyreuth, Napoleon's by the colossus of Vienna. Both works are indubitably mighty, and both works are indubitably minor. But alas and alack, and a very pox on our hopes, for the *Orientale* of Mr. Cui is minor also!

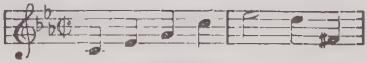
The first truth we discover regarding musical form is, consequently, the important one which has just been suggested. Tonality is irrelevant, and time is also; even major and minor are equally useless as counsellors. For all these broad characteristics furnish

us with absolutely no clue at all to the basic nature of those compositions they will be found in.

We turn therefore to smaller matters, confident that details will not fail us in our perplexity. But again we are doomed to disappointment. If anything, indeed, our perplexity increases. If we compare a mere succession of notes, apart from their rhythm, we find that the *Allegro* of Mozart's G-minor Symphony opens with a phrase absolutely identical with the *Scherzo* of the C-minor Symphony by Beethoven. Transposing the Mozart phrase to C minor, merely for convenience in comparison, we discover that both men use the same syllables, as follows:



We hence may suspect that rhythm is the ultimate secret of musical architecture. Rhythm *must* be the secret, for it is nothing but rhythm which transforms this single succession of intervals into these two totally different musical phrases:



Mozart

Beethoven

But does rhythm actually prove to be the secret? Is it even a small part of the whole secret? Is it

possible to work out some temporal scheme which will pry into the hidden secrets of tonal structures—the smaller secrets, at any rate, if not the larger?

We are tempted to think so by our last illustration, but we promptly find that this expectation was also foolish. For, as regrettably as you please, precisely the same rhythms, down to the most minute detail, will serve as the pulse-pattern of two phrases entirely different. "Hark, the Herald Angels Sing" is based on the exact rhythmic pattern of the *Finale* of Beethoven's "Waldstein" Sonata, in both being as follows:

Again, the first movement of Brahms's Second Symphony (in D major) has the same rhythmic pattern —not merely the same time, but the same rhythm—as a variety of compositions of varied calibre, including "In the Cross of Christ I Glory." In this instance the pattern is as follows:

Furthermore, as practically everyone in the world knows by this time, "Yes, We Have No Bananas" is almost entirely based, rhythmically, harmonically, and melodically, upon the "Hallelujah" chorus in the *Messiah,* "I Dreamt I Dwelt in Marble Halls," and "My Bonnie Lies Over the Ocean"—an eclectic

genealogy if there ever was one! And as many more instances of the foregoing nature may be uncovered by a diligent reader as his native reluctance to believe these truths renders necessary.*

"Well, then," the reader may say to himself, "the real secret of tonal architecture must lie, after all, in harmonic structure." But the answer, again, is in the negative. It is in the negative, even though the *anatomy* of music is certainly harmony, for the reason that a single harmonic structure will perfectly well serve two phrases which are radically different. Indeed, the outstanding variations in musical literature—such as the colossal Goldberg variations by Bach, the Diabelli Variations by Beethoven (and the famous thirty-two in C minor), and those by Brahms on themes of Handel and Haydn and Paganini—are astonishingly loyal throughout to the harmonic pattern established at the outset. In brief, their variety does not depend upon harmonic changes.

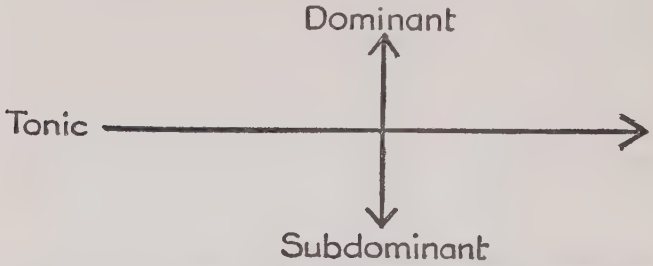
In fine, therefore, search though we may for some ultimate marks of musical identification, every prospective tag in turn disappoints us. The same succession of tones, the same combinations of tones or

* Some moderate general knowledge of music is presupposed throughout this brief outline; the reader is supposed to know his notes and be able to pick out the illustrations on the piano. But if he cannot —and even if he can—the phonograph in this connexion is very helpful. Owing to the fact that a composition—or even a phrase—may be repeated over and over again on this instrument, no invention could be a greater boon to the musical student who is urged here, as strongly as possible, to make use of it in the comparison of details.

the same harmony, the same tempo, and even the same rhythms may be discovered in dissimilar compositions. And we are thus obliged to admit at last that the measure of music never can be taken by merely measuring it. Music, architecture, painting, sculpture, literature—all the arts are arrogantly alike in this respect, that the vital principle within them smiles at yard-sticks. And because this truth is too true to be escaped from, we shall presently be driven back to it in conclusion.

Nevertheless, whilst it always has proved impossible to parse literature, its major forms at least abide description; by the same token music submits to certain kinds of definition in so far as we confine our analysis to general patterns. A few definite remarks may hence be made regarding the outstanding patterns described by music. As the sonata is one of these patterns—the chief one, indeed, of classical music, for symphonies are only sonatas laid out in colour—its characteristic curves and angles are worth noting. Exactly what, then, is a composition called a sonata? Since music is a spaceless art making temporal patterns, what is that pattern known as the sonata-form?

Spatially symbolized, for the sake of brevity, it is the diagram on the following page.
Letting the horizontal line stand for the key-note (tonality giving unity to the composition), the vertical line represents two contrasting elements, one of these being called the dominant (a fifth above the



tonic or key-note), and the other being called the subdominant (a fifth below that tonic or key-note). For these three focal points—the tonic, the dominant, and the subdominant—are the three tones determining the outline of the sonata. And the symmetry of this outline becomes yet plainer when we transfer our principle to music paper, thus:

Now, were we to stop here, we should get no further than a system of tone-relationships which may be found in virtually every piece of music; for the quartets built up on just these three degrees of the scale appear persistently in music of all varieties. Indeed, surprising as it may seem, approximately nine-tenths of all music is founded on them. They underlie songs, tone-poems, operas, suites, preludes, fugues, and so forth, as well as those structures known specifically as sonatas. But the sonata departs from all these other tonal forms, taking us with it on unique adventures, because this simple pattern is

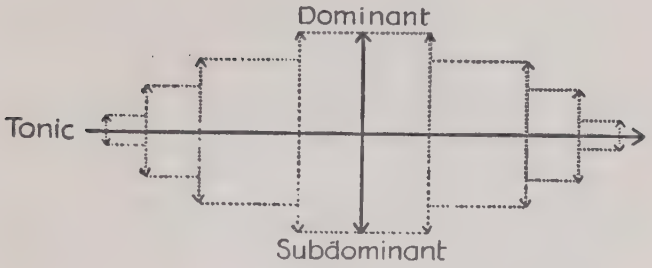
elaborated in a particular manner. It is elaborated, not by being covered with surface ornament, but by the more fruitful method of spreading itself out methodically in larger and larger designs until a single great pattern, compounded of these smaller elements, at once reflects their symmetrical nature and yet includes them. Within the space of a few measures, in brief, the simple design of our three tones will be projected; we shall find the tonic, dominant, and subdominant chords stated at the very beginning of a sonata:*

But after the concise announcement of these elements, the pattern begins to widen; we notice that an entire first section of many measures is emphasizing one element only—to wit, the tonic. Nor do we pass out of the tonic into the dominant until the second

* The letters T, D, and S stand for tonic, dominant, and subdominant.

theme is ready to enter and similarly emphasize a contrasting tonality, which is that dominant (only, in being emphasized, it is transformed for a time into a new tonic). A fresh pattern is thus superimposed upon our old one, the second theme of the movement balancing the first theme just as the first measure was more briefly balanced by the second measure. Moreover, since this principle is continued in force broadly, not only within the first movement, which passes back at last to the tonic, but also within the succeeding movements, which are themselves tonally balanced against one another—the pattern, as we have said, growing continually larger—the sonata as a whole stands before us as an example of true growth and remarkable symmetry. Measure answering measure, section section, and even movement movement, the sonata is at last seen to be the fruition of that small outline which engendered it. In fine, unity again has blossomed in variety. But the variety in which it has bloomed has not blurred it, because the growth has been a true one—namely, a logical. With due apologies, consequently, for invoking space which music has no use for, we may now glance at the elaborated pattern of a sonata. Could we trace lines on time, that pattern would look approximately as the next page shows it.

The reader will notice that curves are conspicuous by their absence; the following design in reality is much too angular, for the spatial equivalent of



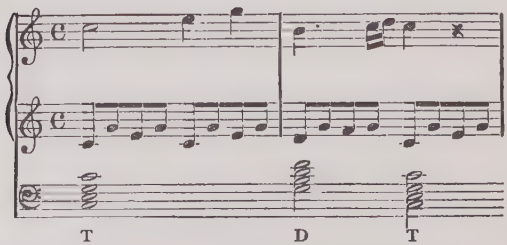
modulation has been omitted to the end of graphic clarity. Subtle transitions from key to key—which curved lines alone could hope to symbolize—are deliberately left out of the picture. Such a design may nevertheless prove helpful by way of enforcing what has been stated here in language; for the sonata *is* a symmetrical tonal pattern, and any device which tells that story boasts some value.

Nor, as we have said in other connexions, is a general principle limited in its application; we are not speaking of one sonata, but of all sonatas. It hence makes no difference whether we consider the sonata we have used for illustration, or another sonata by the same composer, or by another.

In all cases the principle is unaltered. Whenever we examine a sonata or a symphony, the tonal structure that has been briefly outlined will be uncovered. We cannot miss it, because it is a pattern which underlies each separate composition and, architecturally speaking, almost can be identified with it.

Beethoven, op. 13 *

Mozart, First Sonata



* Phonographic recordings of piano music are sadly limited as yet; only a fringe of this immense literature is so available. This Sonata Pathétique (like the Appassionata) is one of the pitifully few exceptions from the hand of Beethoven.

And yet, as we have said, this identification in the last analysis is misleading. Something is left over from the analysis; something always remains behind —and ahead—to chide us for speaking of a "last analysis." For it is just the unique and hence unanalysable character of each sonata or symphony which distinguishes one work from another. In fine, we falsify the real forms of music when we fall back on merely formal definitions.

It is true—and the truth is an important one—that these individual creations called sonatas and symphonies are, as we have seen, astonishingly alike in structural detail. The sonata-form is a definite and clear-cut pattern, and the salient angles and curves in this pattern should be familiar to every student of music. He ought to familiarize himself thoroughly with this important pattern. He ought to compare one symphony with another, one sonata with another, and trace that one pattern which will be revealed by every one of these different compositions. He ought also to become familiar with other pat-

terns—that of the suite, for example, and of the tone-poem—and thus be able to compare them in his own mind with each other. But more than this he ought to do, and eventually must do, else he will be missing those greater things he should be hearing. For until his ears are opened wide to diversity which really is unique and unanalysable, he suffocates his understanding in pigeon-holes.

Whilst the study of musical form is an instructive study, therefore, an unwarranted amount of importance is commonly attached to it, and an excess of mystery surrounds it. The multifarious forms of the sonata, rather than the sonata-form itself, should be the ultimate concern of the lover of music. And what might have seemed a slightly laboured use of biological metaphors hence becomes, at this concluding stage of our survey, more arrestingly appropriate than we suspected.

For—and this truth is as important as the other one—each musical composition is emphatically a living organism. We do not name it such because it boasts a spine which is built up of separate segments. We do not name it such because that spine puts forth four major members. We do not name it such because those four limbs acquire powers of articulation, or because tonal tissue gradually covers the whole framework, or because a shudder of vitality invades the entire body when time begins to course through its arteries. A more compelling reason has invited the

metaphor, and that reason is the one just suggested. A musical composition is a living organism in that it follows out a unique and private career as surely as it conforms publicly to the general pattern of its species.

That, then, there are points of resemblance between musical compositions is a fact which should be expected and duly studied. All men are mammals and bipeds, and the hand of an emperor has five fingers like his slave's hand. But with such points of resemblance resemblance ceases. Thereupon the unique is inaugurated. And it is consequently at this juncture that we take leave, as we are bound to do, of the mere anatomy and physiology of our musical organisms. We set forth instead, as each separate composition sets forth, on that purely personal journey in time which is the structure of its whole career, the only true pattern of its identity.

CHAPTER XIII

THE IMPORTANCE OF MUSICAL THEORY

The purpose of the preceding pages has been the single one of persuading amateur musicians—music-lovers at large—to take up the study of musical theory. To this end, and solely to this end, every word (including the present words) has been written. And the course adopted throughout the work has been no secret. It has been to present amateur musicians—music-lovers at large—with a conspectus of the labours enjoined on them. No attempt has been made, as the writer has reiterated repeatedly, to render those labours unnecessary; only utter fools essay the impossible. Nevertheless, so that exhortation should not defeat its high purpose, precept has been coated with example. In indicating all the main steps taken by the student of musical theory, the easy ascent which they involve has been suggested also; and certain vistas uncovered by them have been dwelt upon.

To retrace those steps now is not my purpose. A synopsis of an outline makes dull reading, and no reader toiling as far as this deserves that punishment. The writer may yet be allowed to explain why so large a task has occupied so small a compass.

The sceptical reader may pardonably fear that omission rather than compression has been responsible. To set that fear at rest is only one of the purposes of this last chapter; but it is an important purpose; and, in all likelihood, it is a prudent one. Whatever value these pages may boast of possessing as propaganda would be seriously affected by alarms of the kind mentioned.

To dispel them is, consequently, necessary. And I know of no better way of doing this than by affirming that this work has done, literally and exactly, what it promised to do at the outset. The sub-title on the title-page is an accurate one; the reader has been lured on with no false prophecies. The preceding pages *are* an exposition of *all* principles underlying musical theory.

Insisting on this may sound boastful, but it is not boastful. For it so happens that *all* the principles underlying musical theory slip, of their own accord, and without the least assistance from any writer, into any vest-pocket which awaits them. The present work inconveniences a vest-pocket, not because those principles are bulky, but only because their illustrations are numerous.

There is a special reason for dwelling upon this circumstance; and, since it is indirectly responsible for the existence of this very work itself, speaking of it seems hardly more than proper.

At present a widespread belief obtains in the

hearts of average music-lovers, and it has obtained over a shockingly long period. The belief, which is nothing but a superstition, is that musical theory is a recondite study; moreover, in many respects, that it is a useless study. On the one hand, it is too difficult to be mastered by anyone who does not plan to dedicate many months to it; on the other hand, it is needed by composers only. Perhaps this is seldom said in so many words; but a literal transcript of public opinion would come surprisingly close to the statements just offered. And, even though those views were never once voiced in public or private, they might as well be shouted from every house-top. For they would do no more than reflect, in a somewhat pallid manner, too, the preposterous situation that does exist in the world of music.

It would be foreign to my purpose to examine here the various causes of this situation. A few of them are hinted at in the Appendix. What I do take the liberty of stressing is the unanswerable state of affairs we have with us. It is a shocking state of affairs, culturally speaking; and it is doubly if not trebly shocking because remedying it would be very far from difficult. Harmony is *not* a recondite study; counterpoint is *not* something for tonal mathematicians to grapple with, and to be made dizzy by, in the night-watches: both studies are fundamentally simple studies, and all later developments are simple extensions of those earlier principles.

Nor should any non-musical reader, chancing upon these paragraphs, suppose that a musical moon is what the writer is crying for. The man who has no music in him at all is not necessarily fit for that nefandous career which Shakspere held out to him. Many of the poets, judging by their musical allusions, are completely tone-deaf. Charles Lamb, whose character was like his patronym, hated music. Macaulay, like many another admirable man of letters, thought so little of the art as to be able to write a history of the reign of James II as if Purcell had never existed. Carlyle is known to have known that Bach honoured Frederick the Great with a visit: the mountain went once, at least, to Mohammed. Nevertheless, in his life of the monarch, Carlyle passes over the incident altogether. Such instances are too numerous to be catalogued. And the sole conclusion to be drawn from them is that culture, and a very high degree of culture indeed, may not include music among its chattels. In some cases, though this is hard for the musician to conceive, music may actually be repudiated. Greek civilization got along nicely with what nowadays would be regarded as tinkling nonsense. There are many men without music in them, and they are not criminals. But—if a needless folly may be named a crime—there are many men with music in them who *are* criminals. They cut themselves off from great adventures which their natures have endowed them for. If they are teachers, they are guilty of conniving

at a belief which does great hurt to the amateur musician; if they are amateur musicians, they are guilty (if more excusably so) of accepting a nonsensical tradition, and of suffering inevitably in consequence.

What this work has endeavoured to do has been to combat a great folly with simple remedies; to show the amateur musician that musical theory is not what he thought it was; to give him the courage to begin studying it; and, now, to wish him god-speed on his journey.

But before he departs he naturally wishes to know that the study is really valuable as well as simple. Why has it just been said that the failure to study theory really injures him? Or, in positive terms, why is musical theory of genuine value? The composer without doubt needs to study it. Of what really practical worth is it to the person who only listens to music?

First and foremost, that is precisely what musical theory makes impossible. It puts an end to the musical listener. For he who studies theory properly, no longer listens to music: he hears it. Even though he studies only harmony, he hears music. And he is able to do this for two reasons. He has been furnished with an anatomical guide without which the structure of what he listens to is inaudible, so that he now puts his experiences in order and is able with great ease to recapture them. In the second place, if the training of

his ear has kept pace (as it should) with the discipline of his intellectual faculties, something else quite as remarkable has happened. It does not happen all at once; it happens continually and progressively. To place one's finger on the actual moment when music becomes for the first time truly audible is, therefore, out of the question. But that, after an imperceptible number of advances have been made, one does hear tones for the first time is unquestionable. There are, as we have noticed, substitutes for this formal ear-training. Listening attentively to a great deal of music over a long period of time is certainly the best of these substitutes, and it is a good one. But it is seldom that the attention is sufficiently active; the substitute, moreover, is a slow method; and for this reason, apart from more cogent ones in other particulars, the study of musical theory is decidedly the best method in existence for training the ear to hear thoroughly the adventures beckoning it.

But there is a still greater reason for the study of theory—greater in cultural portent than any so far adduced or suggested. In consequence, it must be mentioned in conclusion.

As nearly everyone knows, Beethoven was deaf. And it cannot be doubted that deafness—the literal inability to hear actual sounds—is an affliction very close to a tragedy. It was a tragedy, of a sort, even for Beethoven. But what he himself lost, the world—if it would but take a lesson—could greatly profit by; for

what Beethoven's life teaches us is that hearing actual sounds is—however delightful—unnecessary. It is unnecessary for the reason that our imagination must hear music or there is none: there is naught but a succession of pleasant noises.

It may appear to be a paradox—urging the training of the ear only to maintain that we then should learn to dispense with it. It is only a paradox, however, in so far as we forget that the training of the ear is, or should be, conducted to that very end and purpose. It is a method of discipline directed toward adventures in an art which has been liberated from all bonds of the senses. As music is an invisible art, so too it may become an inaudible. For when we are truly educated musically, the crude material no longer is needed. Actual tones have entombed themselves in our memory; and, at the touch of the imagination, they rise up from their little sleep, rejuvenated, purified, eternal.

It is hard for many music-lovers to believe that the musician has no need of actual music, even though he admittedly may enjoy it. And the reader may hence smile incredulously at the suggestion that the world, as it becomes more musical, will more and more abandon the outward stuff of which musical organisms are sensorially compounded. Yet in literature we have an equivalent phenomenon; for in literature the twenty-six letters of the alphabet, drab little tokens though they are, start up sights and sounds, colours and

perfumes, the whole flaming panorama of some vanished epoch, as if the very wand of Titania herself were waved over us. Children cry for pictures in a story-book; the adult, whose eyes have been opened, does not need them—or, more truly, he does not need to weep for a gallery which is spread before him. The eloquence of literal colour and line is an art of its own, speaking in other symbols of a different country; and that other language of an alien land is a noble one. The ability of literature to conjure up colour and form is, consequently, no criticism of the graphic arts or substitute for them. None the less is it true that our drab twenty-six little letters *are* able to resurrect, and even make more resplendent, the crude stuff which our daily lives are composed of. And, in no dissimilar manner, the musician's symbols can, and do, ensure the resurrection and ascension of the stuff of music.

The ability to hear music when a drab page of dry symbols is placed before him is confined at the present time to the musician. I call this ability a cultural portent because the study of musical theory can extend that very same power to all people. The greatest of all reasons for that study, therefore, is the liberation of each amateur musician. At present he is in the bonds of the music-maker, or the slave of his own inadequate fingers; let him only learn the secret of his hidden powers, and of the whole empire of tone he becomes an emperor.

Were this liberation no consequence of such studies, still their value would be enormous. It is indeed pitiful to realize how much music is listened to —especially in this country, where the sheer bulk of performances is unparalleled—and how very little of it proceeds farther than the ear-drum. One is obliged to believe this when program notes flutter continually at every concert; when a mere pillar, interfering with a clear view of the concert platform, is ranked an obstacle to an appreciation of the art invisible; when personalities come first, performances afterwards, and the composition itself just gets in somehow. To doubt that something is wrong is impossible; to doubt that the average music-lover would welcome the opportunity of coming to grips with this amazing thing he only toys with—this also is literally impossible. The hordes of those who, week after week, pour with blind persistence into our concert-halls are hungering for something they have only tasted. And since the general study of musical theory would most certainly cultivate palates which content themselves with scraps from the master's table, full justification of that study resides in consequences no greater than the one mentioned. Really to hear music, really to take an active and continuous part in the innermost life of a musical organism—this is to forswear scraps of meat and command a banquet.

But whilst this immediate feast of the inner ear

is lordly nutriment, such fare should be considered noble less for what it is than for what it leads to. For what it leads to, as we have seen, is a veritable Renaissance in the musical life of the individual. No longer is he obliged to wait on the pleasure of a performer; no longer is he the vassal of time and circumstance; no longer must the lips of a scholar break the seals for him of books written in hieroglyphics: he himself has become a scholar, for he can at last read with his own eyes what his ears hitherto had snatched at in mumbled syllables.

It is unlikely that the sensory delights offered by music will be banished very soon or altogether. To expect this is absurd; to demand it, foolish. Concerts will abound; and growing numbers will doubtless attend them. And more and more, as that throng learns to sit at the king's table, each guest will fully savour his regal privilege. Amateur musicians—music-lovers at large—will wonder, if they remember their old follies at all, how they ever remained content with the paltry pleasures a tickled ear formerly gave them. They will marvel, when they have heard music, why they listened to it.

But more and more, as they hear music, a deeper discontent will overtake them. They will have heard music in the flesh; they will hunger to hear music in the spirit. They will have entered into the great adventures of living creatures whose bodies are tonal;

they will not rest satisfied till they take part in the greater adventures of those same creatures who, entombed for a little while in the imagination, shake off their common investiture of sound to rise up, inaudible and incorruptible.

APPENDIX

APPENDIX

MUMBO JUMBO

Why a thorough knowledge of musical theory should still be ranked with the most arduous of man's accomplishments is a puzzle beside which the Eleusinian mysteries become as leap-frog. A great many persons play the piano; a greater number attend concerts with joy and diligence; yet, for all this general interest in the art of music which in recent years, especially within the United States, must be termed phenomenal, musical theory remains a sealed book to the multitude. To phrase the situation thus, indeed, is to dwarf it. Not only is the average amateur music-lover totally ignorant of the actual meaning of musical theory, unaware both of what it is and where its value lies: a great many amateur and semi-professional executants have only a digital advantage over their mute, despised auditors. I propose a simple test to justify a strong statement. Let every member of any conventional musical gathering be persuaded in turn to step to the piano and play merely one inversion and one suspension: nine persons out of ten will merely blink at you, and you are lucky if one out of fifteen does your bidding. Reverse your test and you will double your disasters; for if *you* play one inversion and one suspension, you will be fortunate indeed to find one person out of twenty or thirty who can name what you have played by merely hearing it.

The second test is no more taxing than the first one, really: it has the more disastrous consequences simply because, of the lamentably few who know aught of musical theory, a lamentable number have ears but they hear not. And they hear not, despite the instruction they may have received in harmonic analysis, because their instructors are not musicians but opticians.

I know of no way to remedy this disgraceful situation save by doing two distinct things in the plainest manner. The first is to denounce as utterly incompetent every teacher whose pupils cannot one and all *hear* their harmony exercises and continually prove this. The second is to announce to the musical world at large that the whole of musical theory is a subject of fundamental simplicity. Harmony is *not* "a special expert branch" of musical education, nor does it concern "only those who intend to engage in music as professionals or highly trained amateurs," although Archibald T. Davison's *Music Education in America* does its bit in buttressing that opinion. Harmony, rather, is the first step in the sound musical education of everyone. The tone-deaf are automatically excluded; barring these, assuming a genuine interest in music and a perfectly ordinary endowment in the way of patience, every listener the world over could easily master harmony within the six-month, and within the year could have considerable proficiency in counterpoint. Why, then, do so few study either subject? Because—mysteriously enough—they are abashed by a wall of tradition; because—not so mysteriously—professional instructors are rather fond of that traditional barrier. And they are fond of it—here all mystery peters out—because, in the first place, the height

of that wall proves what gifted fellows they are in having leaped it, and, in the second place, the pupil's fee continues to roll in only as long as the pupil fails to leap it. Pure egotism and venality are perhaps infrequent; but both in varying degrees are and must be mingled with incompetence unless the phenomena under consideration are entirely causeless—which is a scientific heresy I shall not venture.

THICK-HEADEDNESS VERSUS SOFT-HEADEDNESS

It hardly can be denied that music is the happy hunting-ground of sentimentalists; there is an inordinate amount of rhapsodizing on the subject, and all of it is offensive to the musician. On the other hand, the counter-evil is just as dreadful. Since it is less frequently attacked, I am moved to enter a brief criticism of this other evil which, for all its boasts of clear-headedness, is musically footless.

There is not a particle of doubt that the physicist's equivalent of sound is a series of air-waves; there is not a particle of doubt that the rarefaction and condensation of the air is something which the physicist should study; and it is perfectly scientific to correlate two different sets of phenomena. But deliberately to identify these phenomena, to say that a tone *is* a series of air-waves, and to proceed thence to the point of saying that all music is just literally a lot of air-waves, is bad philosophy, wild æsthetics, and corrupt science.

In a moment of jest the author once drew up a definition of music which, as the type and exemplar of this move-

ment, may be quoted here. The definition referred to runs as follows: "*Music:* a series of varying densities in the atmosphere, which, travelling about 1,100 feet per second, passing through the *meatus auditorius* and proceeding thence to the tympanic membrane, whence their influence is conveyed to the organ of Corti in the immediate vicinity of the *utriculus* and *sacculus,* produce, in certain of the higher vertebrates, pleasure." Now, the physics and the physiology are both accurate enough. The only question is: Where is the music? Or even, on a lower plane, where is the brute tonal experience? The answer to both questions is: Nowhere. The music is nowhere, and the sensation of tone itself is nowhere, because both have been deliberately left out of the picture—and they are left out despite the plain fact that these two factors are the only ones the auditor deals with.

It may, of course, be said that he never would have them to deal with, supposing air-waves and organs of Corti were non-existent. But it may be said with equal propriety that air-waves by themselves never produce music unless there is an auditor to transmute that activity. If an auditor stands in need of the air-waves, so the air-waves stand in need of the auditor; and to term the air-waves music *ipso facto* is not a whit more sensible than to term the auditor music *ipso facto.*

I do not wish to labour the point, but I feel compelled to mention it because a great many writers hold the belief, and advance it as science, that a tone is identical with an air-wave. Such pseudo-scientific nonsense would be laughable if it were not pernicious. John Redfield, for example, declaims in his *Music: A Science and an Art*—a recent

work and fair game for that reason—that air-waves and tones are identical. "In the last analysis," he says, "music is something happening in the air, and it is nothing else." I do not doubt the statement: I deny it. Entirely apart from all æsthetic considerations—that is, viewed simply as aural sensations—music is not something happening in the air: it is something happening in the auditor, in the first analysis, in the middle analysis, and in the last one. And I say that any other conclusion is pernicious—entirely independent of its being corrupt science—because the entire material out of which music is compounded is swept away as incompetent and irrelevant.

The attitude which I inveigh against is in rebellion against the sentimental, which certainly is a point in its favour. But I can see nothing else in its favour.

THE BAD-TEMPERED SCALE

There is probably one question which has confused more musical students than any other: "Why is C♯ the same as D♭ on the piano, and, if they are the same, what is the purpose in giving this single tone two titles?" The most direct, popular clue to the answer is found in language where homonymous words (words of the same sound, but of different spelling and meaning) furnish a literary parallel to our problem. For example, we have *all* and *awl; hair* and *hare; to, too,* and *two; so, sew;* etc. The sounds of these homonymous words are identical, yet the spelling is different because the meaning is. Consequently, if the following sentence is read aloud it sounds sensible (the appropriate spelling and meaning being supplied by the lis-

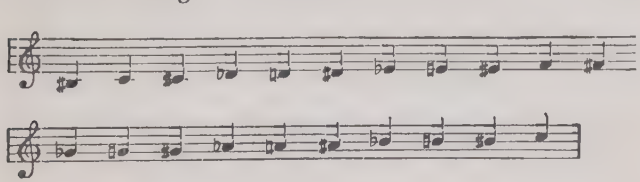
tener), though the reader, faced by different spellings and really different words from those intended, will not readily grasp the writer's meaning: "Music is not in the heir. A hare's breadth between the scene and the herd must be recognized. To many persons their are who neither here nor sea sounds. So that you may reap, sew that awl music you here finds you knot board." In addition to such examples, we also have words which are both spelled and pronounced alike, though we distinguish between them. These (like *left, left*—the adjective and the verb) are fairly numerous.

Now, this verbal situation gives trouble to nobody, though in the last-mentioned detail it is far worse than anything in music. And the musical equivalent of paronymous terms is easily illustrated. Though only the student of harmony can hope to savour the nice distinction in its musical usage—simply because he only has his ear trained—the reader will be able to grasp the appended picture:

But, though he grasps it, he may still wonder why the distinction has any value. On the one hand he wonders why two tones identical in sound have two titles; on the other hand he wonders why, if there *is* some musical difference between them, they appear as one note on the keyboard.

I shall not attempt to give a thorough exposition of these matters. There are many excellent works to be con-

sulted, if the reader cares to delve below the surface; William Pole's *Philosophy of Music* and Alexander Wood's *Physical Basis of Music* are two very excellent chaperons in this matter. Instead, very briefly, I shall try to remove a major confusion. And perhaps the quickest way of doing this is to say that every piano is out of tune, save in the detail of octaves, and is sedulously kept in this condition by the tuner. The discrepancy in most intervals is a small one; but it is there none the less and is important. It is important, not as a defect, but as a virtue. Whatever slight disadvantages it entails are brilliantly outweighed by the conveniences offered. The disadvantage is a slight impurity of most intervals, besides the trouble of reading this explanation; the convenience, on the other hand, is tremendous, taking the form of an immense reduction of the number of keys on the piano keyboard. In fine, were it not for this device, called the well-tempered scale, pianists would have to go out of business, unless they managed to grow some extra fingers, or unless they played everything in one key or a few keys only. For the keyboard would need separate notes for the following at a minimum: *



The physical superiority of our actual keyboard is thus unquestionable. There nevertheless remains the ques-

* If *absolute* theoretical purity were required, the number would need to be greatly augmented beyond this.

tion regarding the persistence of the written distinction. Why do we not compromise on paper also?

Well, under some circumstances we actually do compromise—and an enharmonic change is the name of this compromise. If we find we are accumulating more sharps than can be handled conveniently—say in the scale of G♯—we make an enharmonic change into A♭, thereafter disregarding the difference on paper. But now that we *are* in A♭ the names applied to all the other notes are changed accordingly. Why? For the very simple reason that we wish to keep intact the letters which are the names of our musical alphabet, *and to retain their mutual relationships.* Since the interval G♯—B♯ is a major third (just as the interval G—B is), changing G♯ to A♭ requires us to push the B♯ up to C♮. This is the whole situation in a nutshell.

There is no doubt that the inauguration of the well-tempered scale does violence to the tonal purity of music by dividing the octave into twelve equal intervals, none of which falls exactly where it ought to fall. And a number of critics are bitter enemies of this system. It is, nevertheless, a simple system; the damage it entails is inconsiderable, at least in proportion to its advantages; and as all music so far worthy of the name is based upon it, the likelihood of abandoning it, no less than the evident value of abandoning it, is inconsiderable.

MUSICAL NOMENCLATURE

There have been many obstacles to the development of music, and some of them have by no means been surmounted. Among those surviving today might be men-

tioned: (1) mechanical limitations of several orchestral instruments; (2) the composer's horrific ardour in inscribing his works by hand on music paper, since no practical typewriter for avoiding this has been invented; and (3) the necessity of engraving all but the simplest music for publication, which involves not only considerable labour in the first place, but also additional labour when proof-sheets are corrected. A homely illustration of the last-named point is furnished by the musical illustrations in these very pages—the labour of setting and correcting which was easily treble that required by the text proper. All these—and there are others—are genuine obstacles, surviving to the present day despite various efforts to remove them. Though they are by no means petty in their consequences, however, they appear to be so when we pause to consider one of the most tremendous handicaps under which any art ever laboured. It is now happily removed, but it took the human race several centuries to get rid of it. Reference is made to the slow development of musical language, which, whilst due to the small pressure put upon it, was no less a cause in turn of much lingering by the musical wayside. It is nothing less than astonishing that our present system took so long to develop; but it is not a whit less astonishing that music remained in its swaddling-clothes for many centuries, considering the hopelessly inept methods by which our forbears tried to indicate both the pitch of a tone and its time value.

The clearest account of the development of notation is, as far as I have discovered, *A History of Music* by Charles Villiers Stanford and Cecil Forsyth (Macmillan, 1924), pp. 99–118. To this work the interested reader is

directed warmly. I shall not attempt to summarize the varied data there brought skilfully together, but a few essential points will hardly fail to be relished by my whole audience.

Chief amongst these is the *neume*. The word apparently is derived from *νεύματα*, nods or signs, or possibly from *πνεῦμα*, spirit (specifically Holy Spirit), though, as the historians mentioned amusingly observe, "antiquarians who have to wrestle with the intricacies of the subject assign it a precisely opposite origin." However, whether from the upper or nether regions, neumes flourished in the Church for many centuries and they must have caused a most diabolical amount of confusion; for, posing as musical signs, they were but little better than shorthand notes become illegible. Specifically, they were dots and dashes and flourishes placed over the text to indicate to the bemused singer his vocal duty—telling him, in the roughest possible way, whether he should ascend, descend, or remain stationary. It would seem as if the only virtue in the system was (from the singer's standpoint) the delightful impossibility of convicting him of error. And yet, for all its defects, *there was no other system of notation anywhere;* it had supplanted the Greek system, based on mere letters of the alphabet, and may be considered superior to that; but it was, as the reader may judge for himself, a musical monster. And, what is more remarkable, this same system persisted for many centuries—that is, from the sixth to the twelfth century. Furthermore, to come to a second point, when some unknown musician (about the tenth century) finally conceived the idea of drawing a single line across the page, which would definitely establish the pitch of any sign

placed on it, this one line remained long without company. Hucbald, a Flemish monk of the tenth century, presently had the bright conceit of adding other lines to the original one, so that the pitch of several signs was established; but all of them were *on* the lines, not between them; and not till Guido d'Arezzo appeared on the mediæval scene of musical disorder were the spaces *between* the lines given a ranking (this about the middle of the eleventh century). Still again, to come to a third point, the time value of these signs was altogether indeterminate, though their pitch had at last been established; nor was it until the sixteenth century that the device of leger lines was even thought of.

Other interesting points might be cited, but those that we have dwelt on are ample. What they demonstrate is fairly melancholy: it is hard to believe, without the historical evidence of manuscripts, that the human mind is so sluggish as the history of musical notation proves it to be.

THE TRINITY AND THE WALTZ

The whirligig of time cuts many capers. Not the least amusing of them all is the attitude of the mediæval Church toward triple rhythm. Measure was not introduced into music till 1150, but triple rhythm was used before that date and, in fact, was universally used till the year 1300. It was used for the reason that the number three was the only perfect number; and that number was the only perfect number because the Trinity, manifesting that number and being perfect, obviously rendered any other view ecclesiastically impossible. The Trinity, of course, has sur-

vived the fourteenth century. But secular needs have survived also; indeed, they have had an accession of vigour. For nowadays, as the reader knows, a great deal of sacred as well as secular music is not in triple rhythm, but in duple. We have so completely turned the arithmetical tables on the Middle Ages, in truth, that duple rhythm is the formal basis of our note system: the time value of every one of our notes is a triumph of the principle of duality. Thus, 𝅗𝅥 = ♩♩, ♩= ♪♪, ♪= 𝅘𝅥𝅯𝅘𝅥𝅯, and so on. However, we do honour (very microscopically) a mediæval device which began to be developed when profane interests seized the ear of the papacy. And that honour is the dot placed after a note which we wish to increase by one-half its original value: thus, 𝅗𝅥.= ♩♩♩. The dot is the development (or, if you will, the degradation) of a circle used (because a circle is also perfect) to indicate that the rhythm of the composition was perfect likewise—briefly, triple. Therefore, by what was called *prolation*, the full circle (or sometimes the full circle with a dot in it) showed that perfect time was the rhythm to be followed. When imperfect, or duple, time was to be used, a half-circle instead was made use of. The origin of our humble dot is, hence, exalted.

WILLAERT, WEIDHARDT, ET AL.

The actual introduction of the well-tempered or duodecimal scale into keyed instruments is usually credited to Adrian Willaert, a Belgian musician of the sixteenth century. Weidhardt and Werckmeister also must be mentioned as later labourers in the dissemination and establishment

of equal temperament; and there are doubtless very many men, not less industrious and far-sighted than these, upon whom the iniquity of complete oblivion has fallen. It is therefore incorrect to suppose that Bach either invented the system or introduced it. It is entirely proper, none the less, to recognize Bach's tremendous influence in establishing this scale finally and securely and—so the writer believes—irremovably.

NIL DESPERANDUM

In his autobiography John Stuart Mill tells us that he became exceedingly melancholy in early life upon musing on the law of permutations and combinations; he feared that it rendered an endless number of musical compositions impossible. Considering that bad music would be limited with good, the fearful prospect confronting Mill had its advantages. If his logic had been sound in this respect, he could have afforded very well to dry his eyes. As a matter of fact, however, his logic in this respect was not sound; for what he was overlooking was the temporal element in music—and it is a fairly large item to overlook. Since this item allows the indefinite multiplication of tonal trash, as certainly as it allows the indefinite multiplication of something better, the universal prospect is scarcely brighter than Mill thought it. It seems pertinent to remark, however, that this fear of Mill's (which doubtless is shared vaguely by many people) is utterly without logical foundation—save only in the respect that our own limitations would cut us off from a multitude of the compositions which could literally be endlessly composed. An endless number, a literally endless number, *could* be com-

posed, for the reason that, despite a limited number of permutations of tones, the time value of those tones can be indefinitely altered. For example, take some given phrase. If, first, it is announced in quarter-notes, against a contrapuntal movement of eighths, by augmentation the same identical phrase extends over twice as many measures when half-notes have been substituted in their place. And this process could be extended at pleasure.

Personally I should be quite content if half a dozen more great musical compositions were given to the world, after which nothing more should be composed for a full millennium. But if my readers do not happen to be of this mind, they may yet take logical comfort of the euphrasia here proffered them in their dejection. Their mortality they may weep for, but for nothing other.

In this connexion it may be pointed out again, as an *envoi,* that, limited though the combinations of tones are, that limitation offers no obstacle to musical invention; nor does it threaten to do so for many ages. Composers who have nothing to say (and critics who are similarly circumstanced, though they continue talking) are continually arising in defence of quarter-tone or even eighth-tone scales—the purpose of which would be to liberate the genius of musicians whose imagination is cramped by our present system. I know of no more pitiful confession of incompetence, no plainer proof of the absence of imagination, than this cry for a greater wealth of tonal material. I do not assert that no value resides in a scale formed of more numerous elements than those twelve tones of our chromatic ladder; indeed, on speculative grounds, I am exceedingly interested in the possibilities just touched on. But

to maintain that the art of music has already exhausted, or is in the smallest danger of exhausting, the material given it—this, I insist, is precisely as childish as weeping over the fate of literature which is confined to the twenty-six letters of an alphabet.

READING-LIST

There are many histories of music, and treatises upon it. Rather than hamper the reader with the specious assistance of a bibliography, I mention a bare handful of works only. Favouritism in one item will be charged against me; I can only hope that the sins of the son will not be visited upon the father.

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